

M^{ONDO} 2000

Fall #7

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Cyberpunks

**Todd
Rundgren**

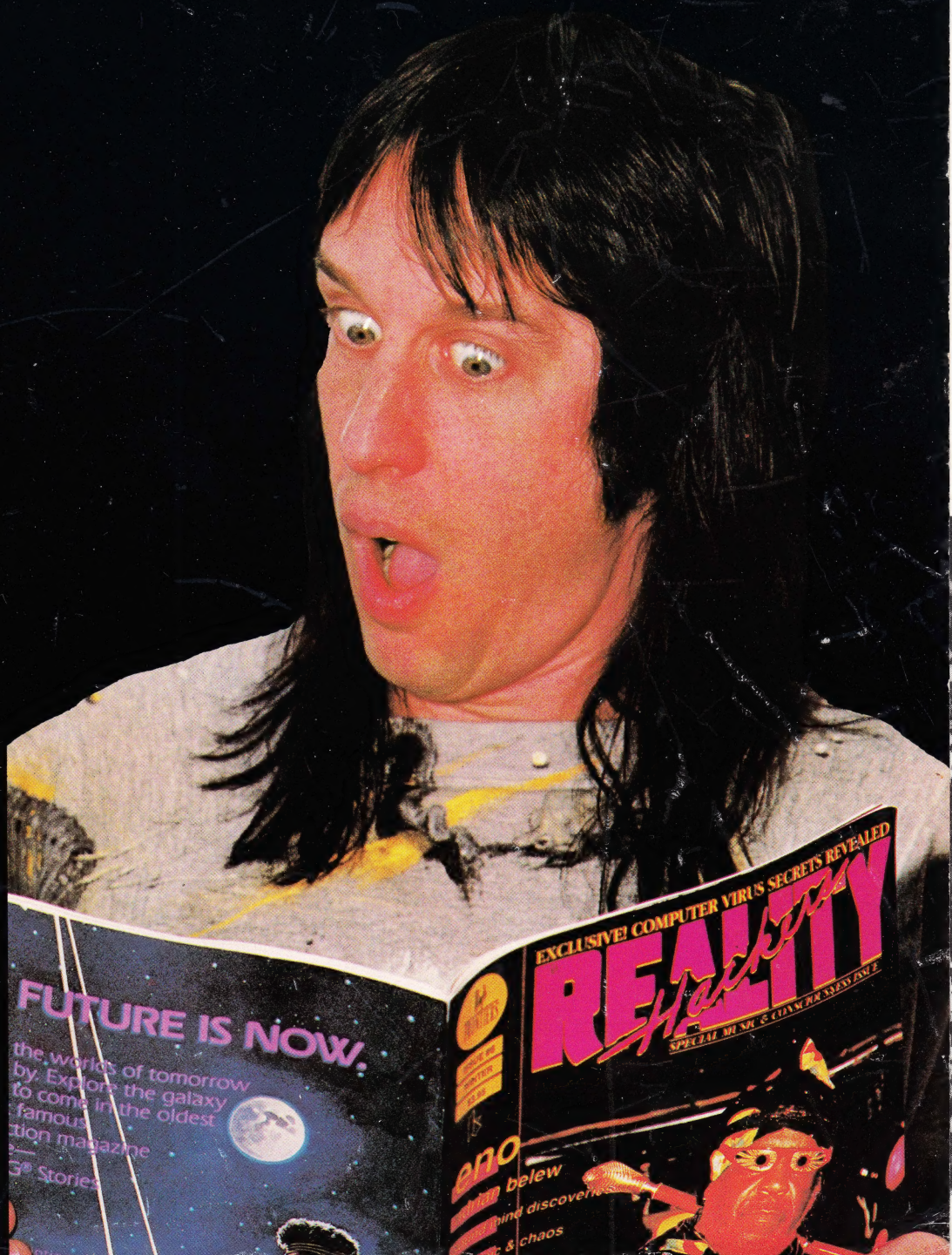
Tim Leary

Wm. Gibson

**Max
Headroom**

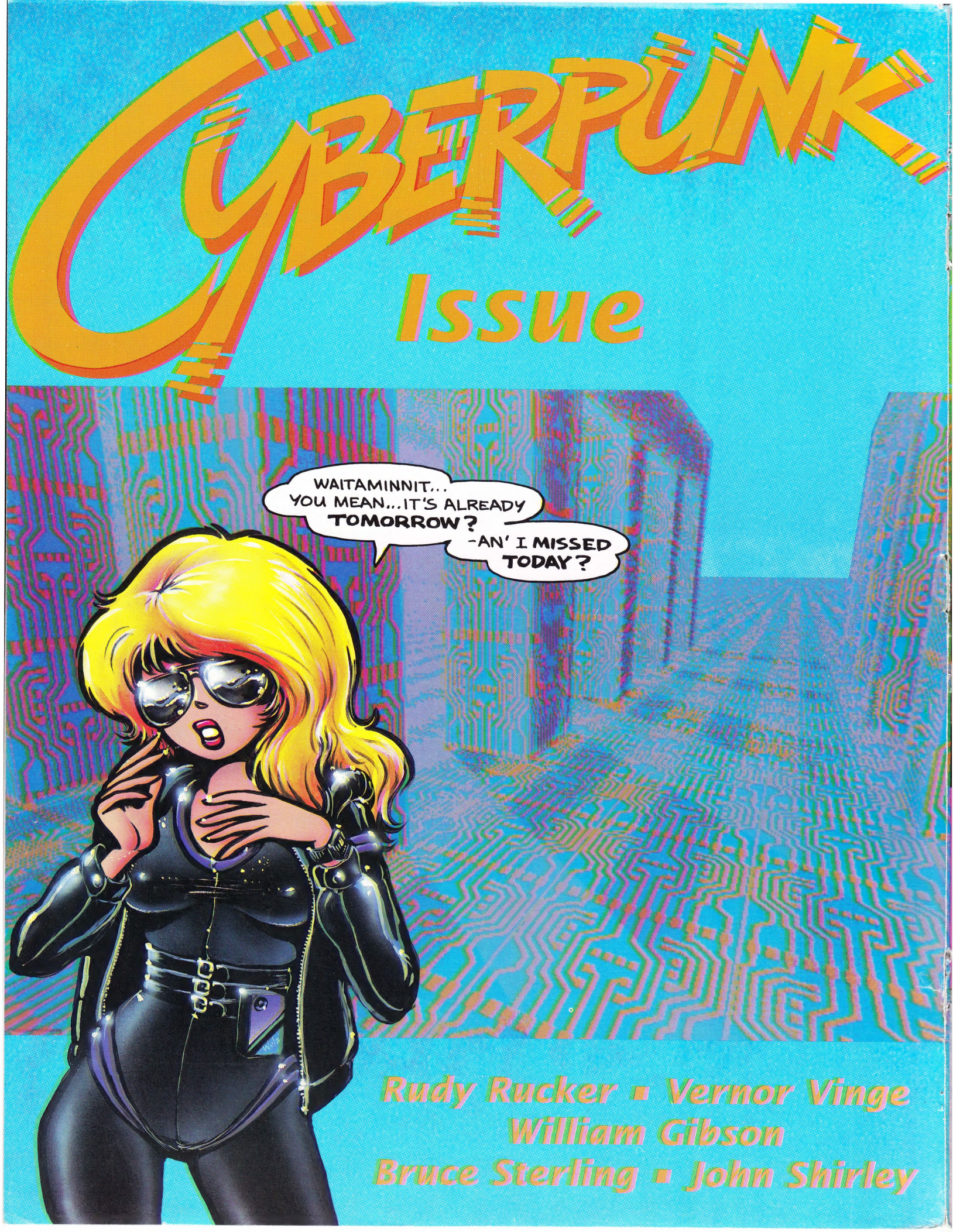
Virusgate

Future Media



CYBERPUNK

Issue



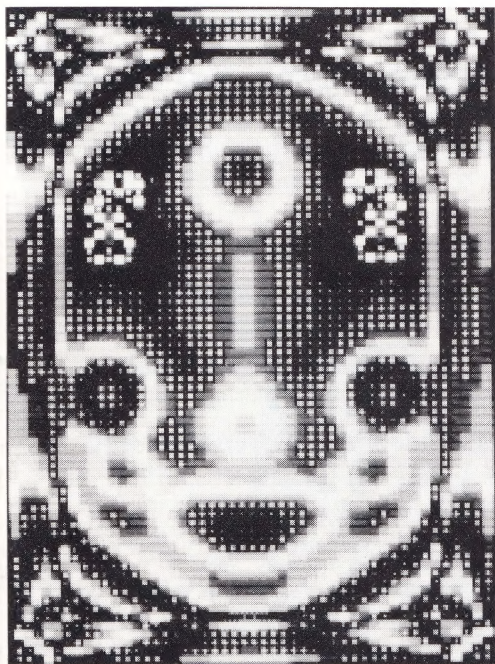
WAITAMINNT...
YOU MEAN...IT'S ALREADY
TOMORROW?

-AN' I MISSED
TODAY?

Rudy Rucker ■ Vernor Vinge
William Gibson
Bruce Sterling ■ John Shirley



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FUTURE MEDIA

- 22 Introducing Future Media**
by Taylor Barcroft & Allan Lundell
- 22 News Briefs: 32-bit Color, Virtual RAM, and more**
by Taylor Barcroft
- 25 "Cray on a Chip": Micro Supercomputing Arrives**
by Taylor Barcroft
- 26 Hyperwebs: 21st Century Media** by Wes Thomas
- 28 DTV — DeskTop Video: A Special Future Media Report** by Allan Lundell
- 34 The PicturePhone Camcorder Connection**
by Allan Lundell & Taylor Barcroft
- 35 U-Force Takes Control of Nintendo**
by Allan Lundell
- 51 Music of the Double Helix**
by Jas. Morgan & Cathy Moe Murphy

FRONTIER TECH

- 16 Is it Live or is it Autodesk? Cyberspace Rising!**
- 18 A Man & His Dog: Cryonics Today**
- 19 3-D Real Time X-Rays with the Digiray Reverse Geometry System**

MIRRORSHADES AND MANIFESTOS

- 52 Leary on Gibson: Here come the Quarks**
Evangelist Leary proclaims Gibson "Quark of the Decade."
- 58 High Tech High Life — William Gibson & Timothy Leary in conversation**
Cyberpunk mainman meets cyberdelic godfather. "That was no interview — that was a drunken business meeting!"
- 67 Rise & Fall of Max Headroom: a conversation with Peter Wagg and Steve Roberts**
by Michael Synergy
Creators of the original British Max Headroom had more in mind than selling Coca-Cola.

74 Mutations in the 4th Dimension: a conversation with Rudy Rucker by Faustin Bray
Rudy Rucker, mathematician, hangs ten on the edge. "How fast are you? How dense?"

88 Call it Revolutionary Parasitism: a conversation with John Shirley by Jude Milhon
Cyberpunk point man, John Shirley, on cyberpolitics & techno-subversion.

98 Coming in under the Radar: a conversation with Bruce Sterling by Jude Milhon
Schismatrix author and Mirrorshades editor winces at the "cyber-word."

114 Hurling Towards the Singularity: a conversation with Vernor Vinge by Michael Synergy
Vernor Vinge, the computer underground's favorite SF writer, on the post-human future.

HACKERS AND CRACKERS

50 Some Good Things to Say about Computer Viruses
by Allan Lundell
Let's eavesdrop on a few hackers at Hacker Haven in the Santa Cruz Mountains.

86 The Sermon on the Monitor: a conversation with St. Silicon by Allan Lundell
The head quantiff of the Church of Heuristic Information Processing holds forth.

94 The Last of the Hackers: a conversation with Richard Stallman by R. U. Sirius
Richard Stallman of the Free Software Foundation describes the original hacker ethic.

102 Beyond Hacker Machismo: a conversation with Todd Rundgren by Jas. Morgan, Morgan Russell & Steve Ananda
Todd's become a major figure in software development. Here he talks about the philosophy behind his work.

105 Extensions of Reality by Todd Rundgren
Edited by Jude Milhon and Jas. Morgan
The evolution of computer technology. Todd Rundgren at a Thursday colloquium at Autodesk.

108 Designer Beings: a conversation with Durk Pearson & Sandy Shaw by Jude Milhon
Saving one's skin and intelligence increase agents.

120 Virusgate: The Spook in the Machine
by Lady Ada Lovelace
Was the Internet Virus a cyberpunk prank or a National Security Agency experiment?

124 From Here To Alternity: John Lilly & Jeffrey Mishlove in conversation
Revealing reconnaissance notes from someone who's been out there.

134 Terminal Disorders by Morgan Russell
Account-ability in the Cyber Age.

136 ATM's & The Rise of the Hacker Leisure Class
by Morgan Russell
A literary excursion into the high tech demimonde.

152 Have I Missed the Revolution? by Lee Felsenstein
Original hacker spouts off.

MONDO ART & KULTUR

20 George Coates Takes SMARTS "Through the Looking Glass"

80 Micro Chic: Artificial Intelligence To Wear
by Zena Kruzick
What makes jewelry sharp? And bawdy-wear intelligent?

84 On the Importance of Being Andy
by R. U. Sirius & Andy Warhol
Andy Warhol was the first comedian of virtual realities. Including excerpts from his infamous "The Philosophy."

118 Light Monks On Hope: the Gyuto Monks
Mickey Hart interviewed by Faustin Bray
Tibetan chant and sound sculpting.

142 Bet on it: Cyber Video Punk Performance
by Brooks Landon
Why cyberpunk Science Fiction can't survive the cyberpunk age.



REVIEWS

- 149** Re/Search: "Incredibly Strange Films" and "Pranks" by John Shirley
- 151** "Valis" by Todd Machover and "Daydream Nation" by Sonic Youth by Gracie & Zarkov

COLUMNS

- 36** Fringe Science: Radio Shack Meets Star Trek — An Artificial Awareness Module by Nick Herbert
A call for the realization of self-conscious robots and PK-operated household appliances.
- 40** Strange Loops: Cyber Evolution Montage by Robert Anton Wilson
Mind-tickling evidence from the illuminated master of conspiracy theories.
- 46** Input Output Input: The Roots of Personal Computing by David Bunnell
How scruffy rock and roll hippies started the information revolution.
- 48** Psychopharmacognosticon: The Cognitive Agent as Cyberpunk Godfather by Terence McKenna
The contradictions of Marshall McLuhan, visionary philosopher and conservative man.

- 146** Better Brains Through Electricity: Ted Alsup — Mind Machine Hacker interview by R. U. Sirius

DEPARTMENTS

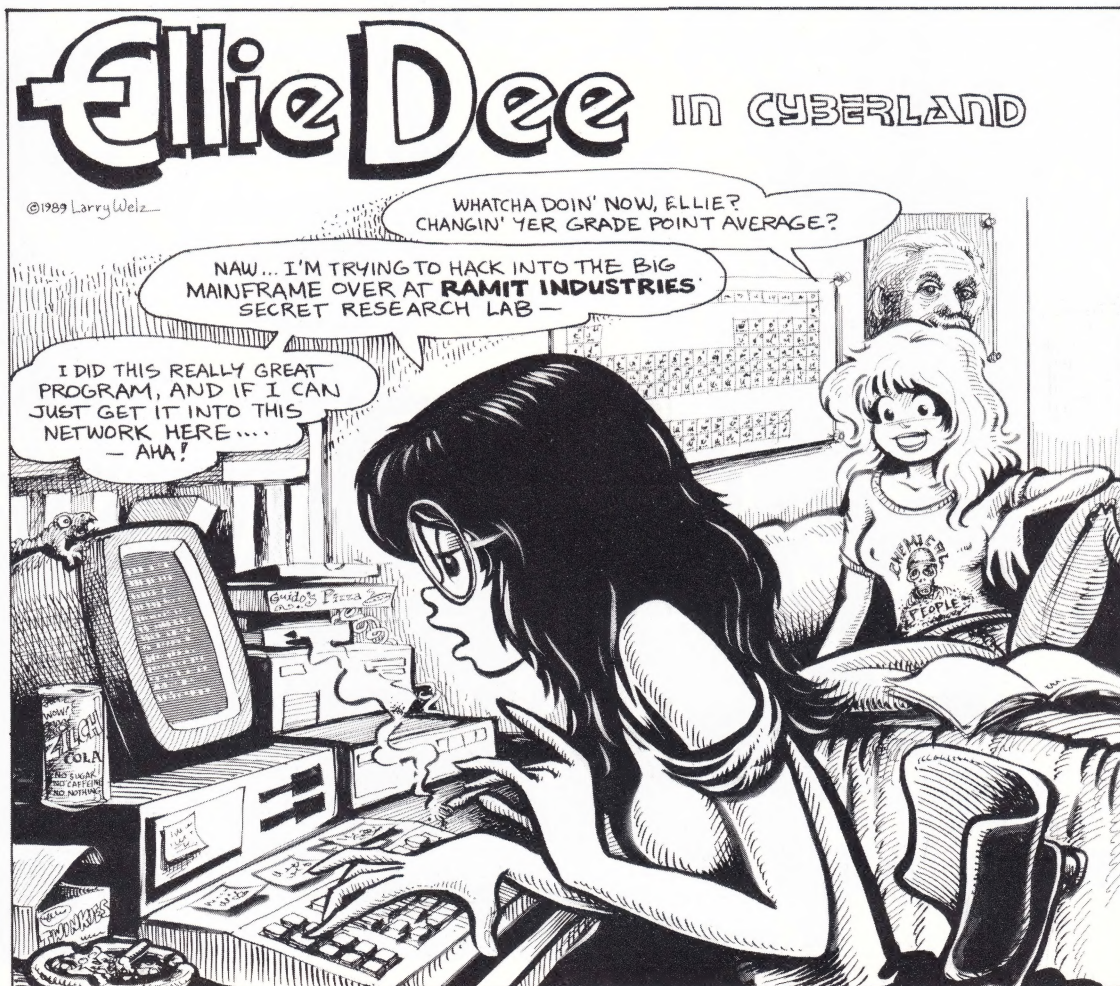
- 12** Letters
- 158** Contributors' Profiles
- 160** Abbie Hoffman's Last Words

ON THE COVER

German Graphic Artist, Brummbär, has recently moved to the States and taken up computer art on the Amiga 2000. We first heard of Brummbär from Timothy Leary who described him as "the Leonardo of animation." He spent a day on our Mac II and created the nameplate with Studio/8 from Electronic Arts. Todd Rundgren is agog over the content of our ancestor publication — Reality Hackers. Photo of Todd by Morgan Russell.

INSIDE FRONT COVER

Brummbär's Cyberbrick Road from Neuromancer leads off to the luminous future. Larry Welz' Cherry Poptart beckons the way.



Catch Cherry Poptart's hacker girlfriend Ellie Dee in her very own "maiden" comic book, *The Land of Woz*. Due out this summer, it recounts Ellie Dee's adventures in Cyberspace. Cherry and Ellie Dee are distributed by Last Gasp, 2180 Bryant St San Francisco, CA 94110, 415-824-6636.

Larry Welz' latest T-shirt features our inside front cover (Cherry Pop Tart in front of Cyberbrick Road) on the front and "Cyberpunk" on the back. S. M. L. XL., all cotton, full color on white at \$15 each. They may be ordered from Bananaland Arts PO Box 4662 Santa Rosa, CA 95402.



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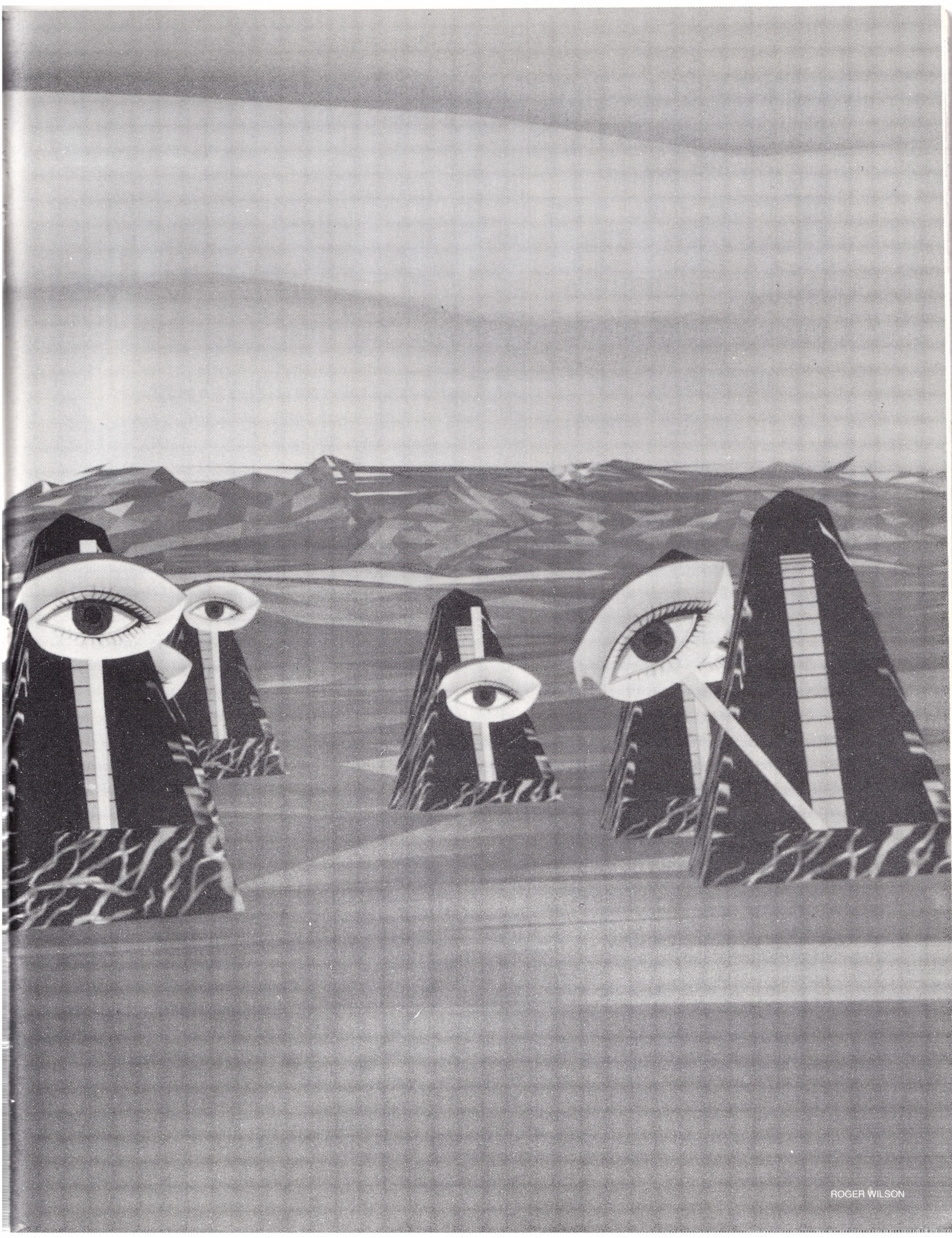
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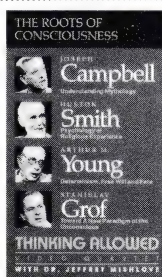
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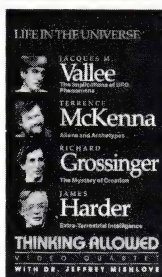
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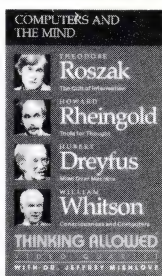
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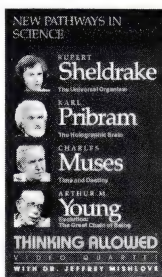
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MONDO 2000 is here to cover the leading edge in hyperculture. We'll bring you the latest in human/technological interactive mutational forms *as* they happen.

We're talking Cyber-Chautauqua: bringing cyberculture to the people! Artificial awareness modules. Visual music. Vidscan Magazines. Brain-boosting technologies. William Gibson's Cyberspace Matrix — fully realized!

Our scouts are out there on the frontier sniffing the breeze and guess what? All the old war horses are dead. Eco-fundamentalism is out, conspiracy theory is *démodé*, drugs are obsolete. There's a new whiff of apocalypticism across the land. A general sense that we are living at a very special juncture in the evolution of the species.

Back in the sixties, Carly Simon's brother wrote a book called *What to Do Until the Apocalypse Comes*. It was about going back to the land, growing tubers and soybeans, reading by oil lamps. Finite possibilities and small is beautiful. It was *boring*!

Yet the pagan innocence and idealism that was the sixties remains and continues to exert its fascination on today's kids. Look at old footage of *Woodstock* and you wonder: where have all those wide-eyed, ecstatic, orgasm-slurping kids gone? They're all across the land, dormant like deeply buried perennials. But their mutated nucleotides have given us a whole new generation of sharpies, mutants and superbrights and in them we must put our faith — and power.

The cybernet is in place. If fusion *is* real, we'll find out about it fast. The old information élites are crumbling. The kids are at the controls.

This magazine is about what to do until the *millennium* comes. We're talking about Total Possibilities. Radical assaults on the limits of biology, gravity and time. The end of Artificial Scarcity. The dawn of a new humanism. High-jacking technology for personal empowerment, fun and games. Flexing those synapses! Stoking those neuropeptides! Making Bliss States our normal waking consciousness. *Becoming* the Bionic Angel.

But things are going to get weirder before they get better. The Rupture before the Rapture. Social and economic dislocation that will make the Cracked 80's look like summer camp. So, in the words of the immortal Rudy Rucker, "Hang ten on the edge" because the 90's are going to be quite a ride!

Queen Mu
R. U. Sirius

Letters

Dear Mu & R.U.,

Hakim is terribly chuffed to have won The Peak Experience Award. He wants to know when he will receive it? Will it arrive by post, or by ESP? And will Dr. Maslow be offended? He's particularly proud to be in your *very best* issue so far — one which represents a major feat in publishing — a *slick* in which one can actually *learn* something.

Meanwhile I enclose Highly Important news for your Cyberpunk ish, which I pray has not yet gone to press. *Semiotext(e) SF* is edited by me and Rudy Rucker and R. A. Wilson and it will be out in the New Year. The two best descriptions so far: "*Semiotext(e) SF* is the *Dangerous Visions* of the 80's" and "If *Mirrorshades* was the palace revolution, *Semiotext(e) SF* is the street riot."

Bless you,
Wa Salaam
Peter Lamborn Wilson
New York City

Write to Peter Lamborn Wilson c/o Autonomedia, Box 568 NY, NY 11211

Editors,

My hearty thanks to *High Frontiers/Reality Hackers* for recognizing my *Cosmic Kunzunnzer* essay with an "honorable mention" in the Peak Experience article. As for the Trog of Mr. Hakim Bey, would Cesar Chavez howl if I were to dispense a sizeable quantity of sour grapes? The netherworld described is a Burroughs-seeded, amphetamine-distended Hobbit tale of non-electrified, medieval funk. Far from a peak experience, it's a retrograde excursion into an advisedly avoided and forgotten tidal pool of stagnant, obsolete lemurian imagery. Other than that, I liked it. But I didn't like it as much as a millennium slurping, orgasmically architected laser bolt into open ended, poly-dimensional, loga-rhythmically accelerating pleasure lobes and layers of virtual realities with a score of Goddess groupies. That's my kind of party, though Hakim is entitled to his idea of the high life, too. I guess that's what makes it a rocket race. My opus attempted to transmit the essence of pleasure palaces of the basic forces of the universe using only the archaic bandwidth restriction of 500 words, which was bypassed in Hakim's much lengthier response, and I had no way to compress the data any further. You got a very stripped-down, run-time version of the code. (I noticed that you did omit from print much of the detail of "the fungal realms" of the Trog; maybe all the best parts?)

Anyway, I'm pleased to announce that the entire escapade, of which *Cosmic Kunzunnzer* is merely the climax, is currently available for distribution through the state-of-the-art medium of consciousness entrainment. The title of this "magnum opus" is *Dr. Lightning and (insert your name here) Meet the Goddess*. Merely adjust your brainwaves to mine, (64 million gigahertz, post-terrestrial amplitude, maximum pleasure/intelligence bandwidth, humor/levity: on, pain/plain/mundane: off), meet me in your favorite reality mode (other than familiar 4-D space-time), say your secret passwords, and place your consciousness in parallel with mine. Once poly-entrainment with higher intelligences is established you are free to participate in any manner agreeable to the parties you may encounter and fabricate your own climax to the experience. *Cosmic Kunzunnzer* depicts only one (though probably one of the best) of the infinite outcomes possible.

This offer is available to women free of charge. The fee for males, in addition to saying "Please," is \$19.99 (payment accepted post-experience only) upon the completion of a thorough background investigation which will be conducted in the aforementioned favorite reality. In addition to these emoluments, I will insist that all participants be treated with care and respect while retaining a spirit of fun and adventure. Finally, for purposes of introduction and initial inquiry, 4-D space/time will be considered an adequate setting. Group rates are available and inquiries by intelligences other than human are expected. Be the second person from your planet to meet the Goddess in the ultimate opulence of Her personal Pleasure Palace. Access my mind with yours.

Soliciting interactive brainwaves, I am,
Dr. Lightning
Miami, Florida

Reality Hackers,

I have followed your evolution from the first *High Frontiers*, through your newsletters, media events, parties, networkings and finally now *Reality Hackers* magazine.

I must say that there are a number of disquieting concerns regarding your approach and promotion of "solid-state" mysticisms, psychedelic drugs, hedonic engineering, new-wave yogatronics and peak experience.

It has been my contention for quite some time, that within the archetypal fields a new development is occurring. While depth psychology and archetypal mechanics describes the state of affairs *as it is* in the unconscious, it does little to predict whether this is a permanent state, and to whether new archetypes can grow and surface in mankind.

It may be that this is the case, and that we are gestating some sort of "solid-state" archetype. The idea that a technologically-dependent trait can exist is more-or-less disturbing to me. It smacks of symbiotic parasitism. It also smacks of closed-loop/closed systems of information

and essence that leans more towards the dark than I care to investigate.

By regularly attaching cybernetic ideas to organic spiritual states I believe you run the risk of losing and reducing paradigms connected with value foundation, ethics, moral principle and grace.

While it is true that some cybernetic metaphors resemble their organic counterparts, some, as well, do not.

I have yet to see or hear of the development of a system of ethics surrounding the application of the many yogatronic devices you proselytize. As one evolves through higher yogic or illuminated realms, specific relationships with these principles become focal, according to traditional lore. Is there a parallel within the cyber-paths to illumination?

Respectfully,
Tom Lyttle
*Psychedelic Monographs
and Essays*
Boca Raton, Florida

Huh? Play that again?
R. U. Sirius?

Dear Sirs,

While reading your issue #6, I came upon a quote in Morgan Russell's introduction to Michael Synergy's article on Cybernetic Terrorists which was erroneously attributed to me. I never said anything remotely related to his quote. It takes a mean and sick-minded person to create and unleash a computer virus that can cause aggravation and suffering to so many people, but roasting the culprit on a spit and tearing off his flesh in strips with pliers seems a bit extreme of a reaction to me, and hardly sets an example of compassion for our fellow humans. Please set the record straight that those were not my words.

Keep up the great articles, especially the information about psychoactive drugs!

Best Wishes,
Bill Atkinson
San Jose, California

Dear Reality Hackers,

A few comments on your issue #5 which I received last week. The magazine fell short of my expectations, what with the title and sub-heading "Information Technologies & Entertainment for Those on the Brink."

Well, I must admit that I found portions entertaining, but as to informative — give me a break! While some of the ideas presented are thought provoking, such as television piracy, the bulk of the material was definitely from the blunt edge of the American consumerist ethic, dressed up with space age hippy trappings, pseudo-scientific mumbo-jumbo and hucksterism at a level which would embarrass a snake-oil salesman. Your fawningly uncritical take on anyone who dumps the requisite advertising dollars in your magazine makes payola look like a bastion of stern objectivity, or

is it only a coincidence that the foremost advertisers also took the bulk of your editorial copy glazed with sychophancy?

Why do exploration and analyses of new types of consciousness and cyber realities have to be so expensive and accompanied by so many toys for the wealthy?

Rather than challenging and questioning the structure of your society and working towards new linkages, you are merely playing the same old shell game with a bit

of new glimmer and some neat buzz-words thrown in. A very poor showing.
Disappointed,
Jim Carruthers
Montreal, Canada



TIM HILDEBRAND

Oops! We accidentally sent Jim a copy of Reality Hackers Lite. But to make it up to him, we've sent him a free copy of our latest video, The Babes of Cyberspace. Jim baby, love ya!
R. U. Sirius

Dear Hackers,

Finding and reading your magazine brought tears of joy. This magazine is almost too good to be true. I couldn't resist sending you my "Rhymes against the State." I know it's probably crude and amateurish but not bad for a person who's spent the last 17 years scouring the west coast of America from here to Peru searching for a good uncrowded surf spot.

Surfing is the ultimate act of quantum physics, actually getting physically involved in a swirling wave of probabilities, riding a trajectory thru dynamic energy fields, and entering tubing cylinders of water which might even produce CTL's. The problem is the lack of good quality uncrowded unpolluted waves; they're few and far between. Nobody seems to believe in the idea of making high quality wave pools. There are some wave pools around, but just crummy commercial ones.

Technologies exist to create waves better than any on this planet. Everyone could be surfing perfect waves if they had their own wave pool. Just like everyone could have brain wave machines, indoor gardens, portable music studios, and who knows what else.

Keep up the hacking.

Yours Truly,
Brian Clark
Manhattan Beach, California

Hackers,

I have a suggestion. Do more articles on future intelligence chemicals, consciousness theory, home-made neurotransmitters, the brain juice underground, and illustrated astral sexual techniques. Then, maybe something about some fun-to-use software. (Did I tell you that one of my friends is the best-connected IBM software pirate in South Florida?) This would be an improvement over the last issue. Don't be too hurt by what I'm going to say, but the last issue was pretty lame. The Music & Consciousness issue? Sun Ra is unconscious, and Heavy Metal?? Heavy Metal?? I don't get it, but the stuff seems like a really down, temper-tantrum type of complaint to me. Oh, but maybe since it's so naughty?! Won't Mommy be displeased?! I missed my chance to imprint this noise in a positive polarity so, for my money, either send me the proper re-imprinting chemicals, or refrain. How does anyone beyond pimples . . . wait a minute!! It's supposed to be CAMP!! Right!! Like Batman was?! But, I thought Batman was an ass, too.

Brutally honest, I am,
Dr. Lightning
Miami, Florida

RH:

I am not in your brackett/level of thought, tho you noted Durk & Sandy, mind nutrients, I'm seeking liquid interferon nasal spray measured in ml's, noted in *Life Extension* tho where the person that had it got from another hav' 'u any info on this product?! If 'u want comment on further info of use to me —

serotonin
Johnstown, Ohio

Here's a few bits of info of use to you: Early next year, babies will be born just by thinking about them. All body openings will close with a snap. Peoples' feet will turn into hang gliders. Sex is unnecessary when you're coming constantly. Write for further info of use to you. R. U. Sirius

Dear Queen Mu,

Synchronicity works, even over here in China. Just last week I received a long letter from John Shirley (the Lou Reed of Cyberpunk), which included a lengthy description of your magazine ("It's kind of cyberpunk and kind of new age and kind of like *High Times*. Drug freaks on computers.") Then yesterday I received your note with the copies of the latest issue, which looks very interesting indeed. Since I'm talking about heavy metal to a class next week, I immediately turned to the piece you had on H-M and was duly impressed; *we need this kind of serious/playful/informed discussion.*

Great what you're doing with your magazine. Timely as hell!

Larry McCaffery
Beijing, China

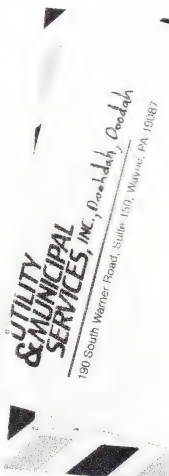
Larry is the editor of the Mississippi Review Cyberpunk issue (1988). He edits Fiction International (U. of Illinois) with Harold Jaffe. Their coming issue is chockablock with SF writers: Le Guin, Delany, Sterling, Russ, Disch, Gene Wolfe, Russel Hoban, etc.

Alison B. Kennedy, Publisher,

In your current issue, I enjoyed Ralph Abraham's article ("Visual Music and Chaos Theory") and applaud your publishing articles of that type — and I showed your article on computer viruses to my friend Ann. She works at a large computer manufacturer. She wanted to take the article to the techies at work, but was concerned about the first page being so colorful it might get her in trouble. Interesting problem, which I'm sure you've heard before.

Yours,

Lynn B. Ehrnstein
Psychedelic Monographs and Essays
Los Angeles



Dear Editor,

I want to retract most of the negative comments that I made in a tirade that I sent you about a month ago.

Recently, I had an opportunity to see Sun Ra at the Cameo Theatre on Miami Beach and I take back the dubious evaluation I offhandedly made about the man and his group.

In addition to swallowing that tidbit of crow, I revisited the remainder of the Special Music and Consciousness issue and, instead of concluding that it was "pretty lame", I guess it dances pretty good after all.

I do have a plausible excuse for my overall nasty evaluation that day. After consulting my astrologer, Mistress Orgasma, she informed me that I was suffering through a quadruple biological low on the very day your magazine arrived. Also, the effects of reading about the

Now, in your most recent issue I note that I will be appearing — rather, "coming" — in a future issue featuring also cloning, cryonics, AIDS, and Taoist hallucinogenic incenses. That sounds as if much thought has been devoted to achieving a well-balanced issue.

Truly, I can barely wait. Just please give me some minor inkling as to what it is you are expecting. Or, as the late Aleister Crowley might put it, I am mildly curious as to just what the bloody hell you would enjoy receiving.

Yours with deep devotion,

Papa Bob

Robert Masters, Ph.D.

Secretary of Defense

The Planet Beelzebub

Pomona, NY

R. E. L. Masters is the author of such seminalia as Eros & Evil, The Cradle of Erotica, and Forbidden Sexual Behavior (Ivan Stormgart Books, PO Box 1232 GMF, Boston MA 02205). He collaborated with Jean Houston on the now-classic Varieties of Psychedelic Experience and Mind Games. His latest is The Goddess Sekhmet (Amity House, 16 High St., Warwick, NY 10990).

Dear Vimps:

Censoring the diagrams for the Automated Teller Machine article is an act of castration! The diagrams were painstakingly wrought and an integral part of the whole. Hoffmann is nothing if not *gründlich*!

The techniques outlined in the *Hack-a-Tracts* are original and work with existing technology. Most cyberpunk writing is a sterile exercise in futurity. It doesn't necessarily push the development of our current institutions further along.

Hoffmann and I believe in raising the level of complexity and letting the more astute prevail. Very English public school sense of fair play, I should think. The information on security holes in the banking system was to be supplied to bankers and hackers at the same time. They were to have an equal chance at the starting-gate. But you know where I'd place *my* wager!

Hoffmann is in a perfectly foul mood, phone unplugged, uprooting ivy to vent his rage! Yet he is confident that the techniques will spring up in other places, if only through Morphic Resonance. Ultimately, he can be assuaged. But Hitler. . . absolutely the worst! Unspeakable!

You cannot know my sufferings!

Rabidly yours,

F.W. Mabuse

PS: *Fearless* publishers may write to me in care of this gutless magazine.

See "Terminal Disorders" and "ATM's and the Rise of the Hacker Leisure Class," pg. 134 — 142. ed. ▲



gloomy fungal realms of the melancholy Troggs further poisoned my perspective.

So, feel better! It was a fine issue after all. Belatedly warming your journalistic hearts, I am
Dr. Lightning
Miami, Florida P.S. Heavy Metal still sucks!

Dear Mu,

First of all, let me call your attention to the page from my book, *The Cradle of Erotica*, which I have enclosed.

It is my humble suggestion that Queen Mu might wish to follow the illustrious example of the Empress Wu — to the greater glory of Her Endlessness and perhaps to the mutual satisfaction of both the visitor and the visited.

I recall fondly our discussion about the possibility of my contributing to your august periodical materials on sex magic, sex magick, Tantra and the like. However, it was my understanding that we would communicate a bit further as to date of publication, length of contribution etc.

Is It LIVE . . . — OR — Is It AUTO DESK?

*A cyberspace
experience
might be a
simulation
of an entirely
imaginary world
— as long as
the space is
physically
lawful and
self-consistent.*

Cyberspace Rising!



ZENA KRUZICK

"REALITY JUST ISN'T ENOUGH ANYMORE."

So says Meredith Bricken quoting Autodesk's John Walker. Meredith is one of six people involved in **Cyberia**, the company's Cyberspace Initiative.

The term "cyberspace" harks back to William Gibson's novel, *Neuromancer*. There it was used to denote a global computer/communications network supporting "consensual hallucinations" involving billions of people on a daily basis. Cyberspace, as conceived by the Autodesk crew, is a multi-dimensional information space containing objects that can be manipulated either directly or remotely. Through a variety of cybernetic devices and computer-based techniques, a human "cybernaut" is made to feel as if she is actually within an alternative reality. In the words of Cyberia project member Randy Walser, "the cyberspace business is the magic business — the business of making illusions."

Technological visionaries have been talking about cyberspace, under various names, since the sixties. Papert speaks of "microworlds," Krueger of "artificial realities," Nelson of "virtuality," and Walker of "the world in a can." Indeed, the notion of projecting one's self into a virtual space is familiar to hackers throughout computerdom, from UNIX masters who "move" deftly around the UNIX file hierarchy, to adventure gamers who "fight" the forces of evil in imaginary worlds.

A cyberspace experience might be a simulation of an entirely imaginary world — as long as the space is physically lawful and self-consistent. The *Ball Blazer* videogame by David Levine and Lucasfilm, in which the physics is similar, but not identical, to ordinary mechanics is a primitive example.

One purpose of simulations is to help people understand different realms of discourse. People will enter cyberspace to experience what it is like in worlds they cannot experience first hand. Initially Cyberia will operate within laws analogous to the physical laws of ordinary three dimensional reality. Actions in a well-defined volume of physical space, called a control room, will be mapped into consequences in cyberspace. Using various props and input/output devices, a human will direct the activities of a virtual body or "puppet."

Puppets are important players. A puppet is any object in cyberspace whose actions are controlled by a remote intellect. It is the vehicle through which a cybernaut experiences cyberspace. Cyberspace is haunted. Trees speak, houses move, bicycles fly, and you yourself can project your center of awareness, and your personality, into any object that doesn't already have a "spirit."

Cyberia employs a startling array of input/output devices. Two Sony Watchman 3" TV screens are worn on the nose and broadcast a stereo image designed to give the viewer the illusion of being inside of the visual space. A "headtracker" tracks the movement of the viewer's head

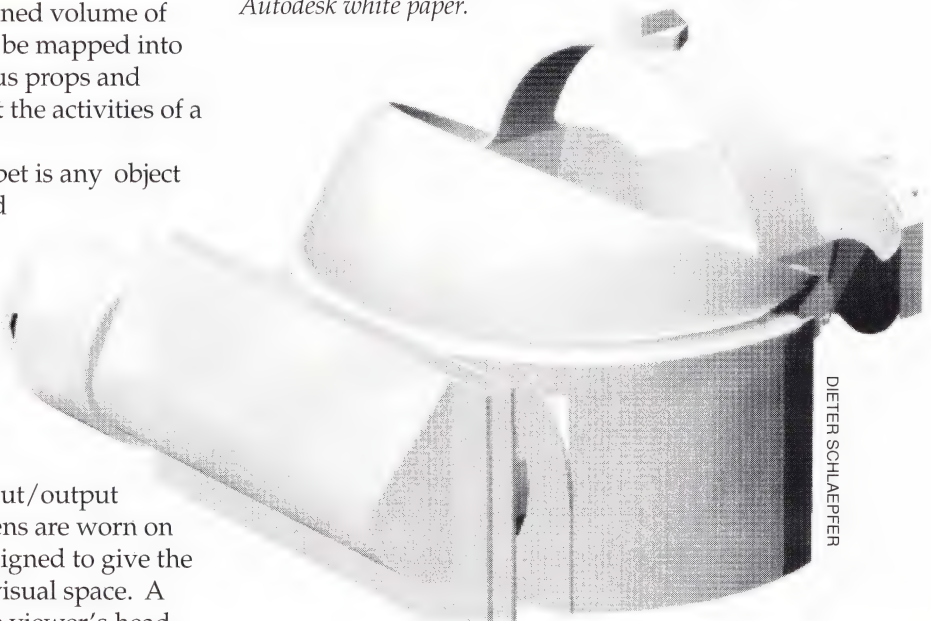
and changes the scenery in a correspondingly appropriate manner. VPL data gloves allow the viewer direct manipulation of objects in the Cyberian landscape — spoken keyword recognizers allow for further viewer interaction with the cyberspace.

The list of potential devices and props includes whole body suits with sensors for every joint position, reflectors that stick to clothes or skin and that can be sensed remotely, computer vision systems that quickly analyze video images and track body positions, stationary bicycles, treadmills, rowing machines, tunnels, chairs, musical instruments, steering wheels, accelerators, joy-sticks, and so on. Indeed, any artifact of the imagination that can be worn or moved is a potential device for controlling puppets.

The crew at Autodesk are making the software tools for constructing cyberspace. Artists will be able to use this program to create cyberspace realities for viewers to play around in. Cyberia may prove to be the penultimate word in home video entertainment (after 3-dimensional holography). Another possibility is that Cyberia will start off as a network of hubs organized around dominant themes or activities, like education, business, entertainment, or fitness. Communication among devices within a hub will likely be via fiber optic cable, while communication among hubs will likely be via microwave, laser or wire.

One prediction is that customers will visit Cyberian hubs much as people today attend health clubs, museums, art galleries, theaters, or pick-up bars. The hubs might also be housed in corporate workplaces or schools. But wherever the hubs are located, the cyberspace experience will transcend space and time. ▲

NOTE: Major portions of this report are taken from "A Few Thoughts on Autodesk's Cyberspace Initiative," 1989, by Randal Walser. The newly formed Cyberia Project includes Meredith Bricken, William Bricken, Eric Gullichsen, Eric Lyons, Gary Wells, and Randal Walser. The initiative was first proposed by John Walker, in "Through the Looking Glass," an internal Autodesk white paper.



PAUL SEGALL

A Man and His Dog

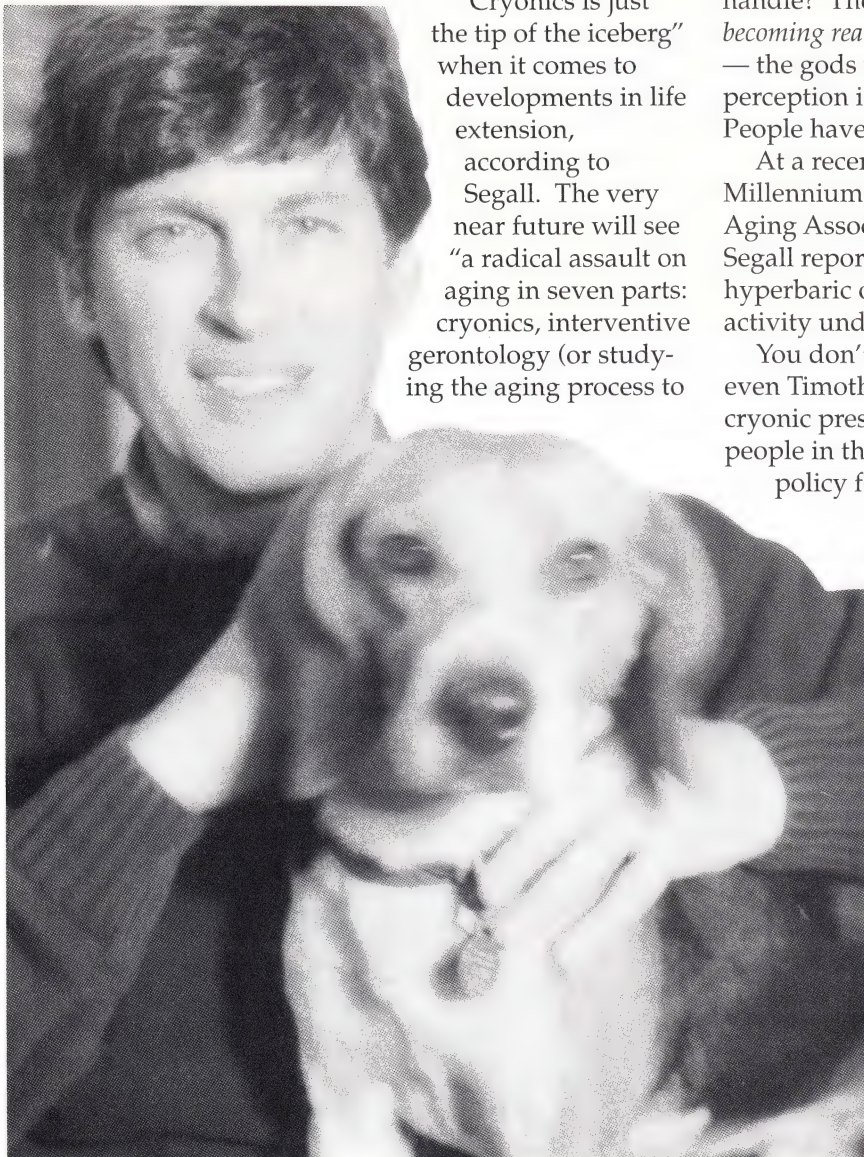
The dog, Miles, has been chilled down to near ice-point temperatures for 70 minutes.

All cardiac activity ceased.

The man, Dr. Paul Segall, is one of the world's leading cryobiologists.

The dog is the man's Pet.

Dr. Segall and his team of scientists chilled Miles in his TransTime Laboratory in Berkeley, California, and then successfully revived him. Today, over a year after his near-death experience, Miles is still, in Dr. Segall's words, "a fully functional dog."



"Cryonics is just the tip of the iceberg" when it comes to developments in life extension, according to Segall. The very near future will see "a radical assault on aging in seven parts: cryonics, interventive gerontology (or studying the aging process to

do something about it), transplants, artificial organs, resuscitation, regeneration, and cloning."

Segall says that the general public is unaware of how much progress has been made. "Science is sending quakes throughout society. And you know what they can't handle? The real kick in the head is that all this is *becoming real, now*. There's a fear that we're going too far — the gods will be offended. After all, the public perception is that we're talking about immortality! People haven't figured out yet that they *deserve* it."

At a recent symposium titled "Gerontology in the New Millennium: The Life Extension Sciences." (American Aging Association, October 5, 1988 in San Francisco), Dr. Segall reported that recent experiments indicate that hyperbaric oxygen may prove useful in reviving cardiac activity under ice-cold conditions.

You don't need to be Walt Disney, Michael Jackson or even Timothy Leary to get iced. While the full cost of cryonic preservation with TransTime is \$125,000, healthy people in their twenties or thirties can get an insurance policy for around \$30 per month.

Most people, and particularly the young, don't want to think about death, which is one reason why cryonics makes people nervous. And, of course, the social and philosophical implications are staggering. However, if you picture Dr. Segall as an unnatural technocrat, or a mad Doktor Frankenstein, you're terribly mistaken. Segall is a veteran of the politics and experiments of the 60's, and has long been involved in communal and alternative lifestyles. His favorite political button? "I'm a Freeze Voter." ▲

Dr. Segall's newly-released book, Living Longer, Growing Younger: Remarkable Breakthroughs in Life Extension, co-authored by Carol Kahn, is published by Times Books, New York.

DIGIRAY

Digiray — a fast, safe, inexpensive, all electronic, 3-D x-ray machine — is being brought to market by nuclear physicist Richard Albert after fifteen years of development.

The process was derived from a flash insight, a radical reconceptualization of basic radiographic principles. The re-think is based on "reverse geometry" and results in 90% less radiation bombarding the subject.

The converging geometry of the *Digiray System* is the reverse of the geometry of conventional x-ray systems in which x-rays spread out into a wide cone. In the *Digiray* geometry, x-rays are confined to an imaging cone which starts out the size of the tube and reduces to as small as one millimeter at the crystal detector where the x-rays are absorbed. Consequently, *Digiray* will be far safer for the subject and require little shielding to protect operating personnel.

A common problem in conventional x-ray systems is the scattering that reduces image contrast and results in loss of detail. In the *Digiray System*, x-ray scattering effects are virtually eliminated by reverse geometry and collimation — the use of an array of four million 1/8th inch long by 5/1000th inch square focusing tube elements which direct radiation onto the detector. Scattered x-rays miss the small detector and are not included in the image. The result is an extremely high quality image *making it possible to see soft tissue as well as bone in one picture.*

X-rays are imaged by a scanning electron beam large area source that is produced at the target and transmitted to a detector. The detector, a small crystal, converts the x-rays to visible light which is in turn converted to an electrical signal by means of a photosensitive tube. The detector can be a scintillator-photomultiplier or photodiode and may be mounted at the end of a probe as small as 1 millimeter to explore interiors. A focusing collimator directs the x-ray beam to the detector thus radically minimizing the necessary radiation to achieve image clarity. That signal is then digitized and sent to the computer for image storage (1K x 1K), retrieval and enhancement.

Using polarized eyeglasses, the observer sees a three-dimensional image. Stereo images are obtained in real time at the rate of one frame per second. Users can shelve their image intensifiers or video cameras as *Digiray's* first generation images are excellent.

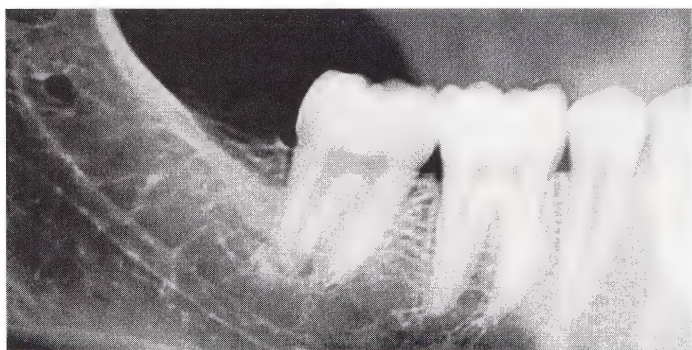
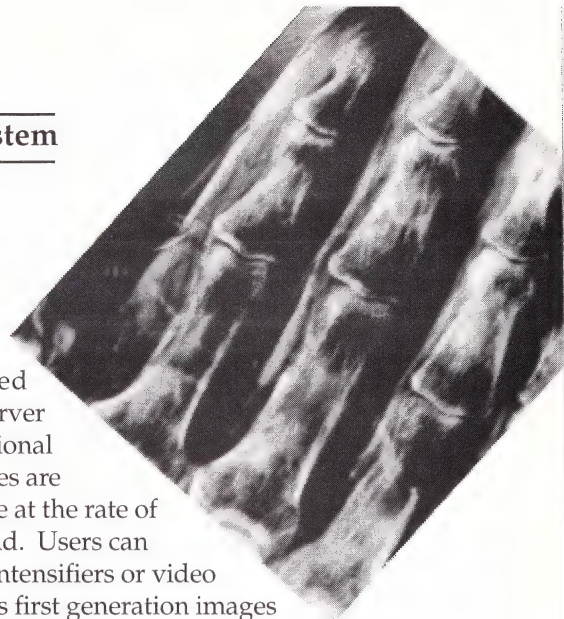
An 8 bit digital-to-analog video converter displays images on a video monitor in standard RS170 format. Low density materials such as soft tissue, cartilage, blood vessels, plastics, glass and composites can be imaged. *Digiray's* detector is nearly 99% efficient (compared to the 2-3% efficiency of x-ray film) and the system rejects the scattering of x-rays. Because of these two factors, twenty x-rays taken with the *Digiray System* will produce less radiation than a single conventional x-ray. Additionally, the images produced have a photographic clarity. *Digiray* is a significant advance because:

- 1) Costs are cut because *Digiray* doesn't require expensive image intensifiers and vidicon tubes. Hard copy can be made by a laser printer. Data is stored on floppies, laser disk, or tape.
- 2) The information is easier to read and interpret. Conventional x-rays record 16 levels of grey scale; *Digiray* records 4,096 grey levels and displays up to 256 at one time. Arbitrary assignment of colors to these grey levels allow one to distinguish details that might otherwise be missed.
- 3) Images can be transmitted by phone lines/satellite in five seconds without loss of data or quality as the images are digitized and fully electronic.

The *industrial version* has already been approved by the FDA and five hand-made units are being placed in industrial settings as beta test sites: airline baggage inspection, aircraft structural defects inspection, packaged food foreign object detection, printed circuit board inspection, and defects in lightweight composite materials where consistency throughout the parts is all important.

Digiray expects to introduce its lower radiation x-ray system for medical applications by year-end. There are still hurdles to overcome before *Digiray* gets final FDA approval. Anticipation is running high however, with the cost of the system only about one hundred thousand dollars vs. one million dollars for a conventional digital x-ray system. ▲

Digiray, 2239 Omega Road, Suite 3, San Ramon, CA 94583
415-838-1510



COATES takes SMARTS Through the Looking Glass

“Curiouser and curiouser!”

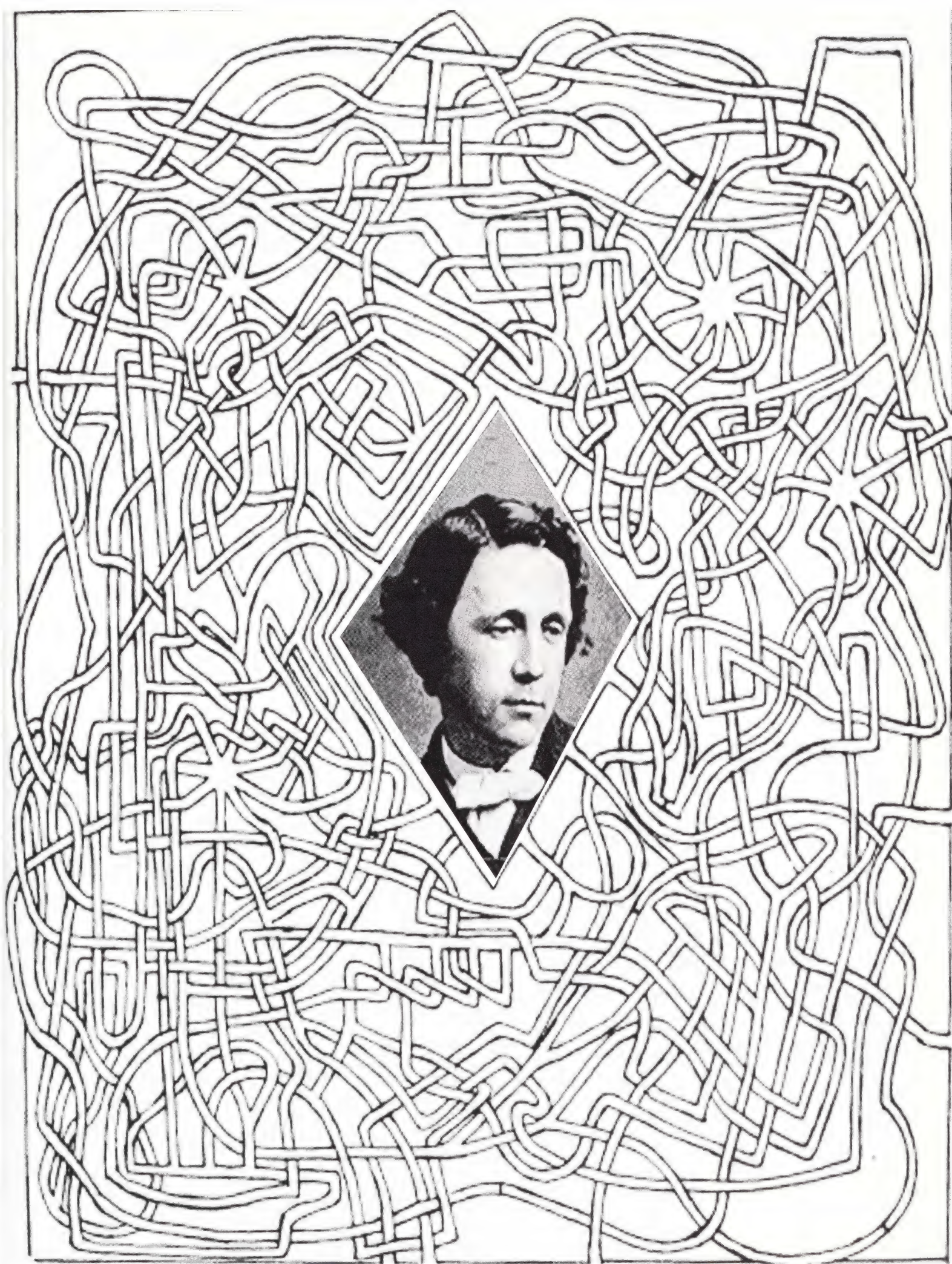


San Francisco's premier multi-media performance director, George Coates (*The Way of How, Rare Area, Actual Shō*), is planning his next piece, and it may be the most spectacular cyber-art event to date. Loosely based on "the nervous system of Lewis Carroll," Coates intends to use the latest in high technology to take his audience "through the looking glass" with him. To this end, he's hooked 15 leading-edge Silicon Valley Corporations together into an organization called SMARTS, Science Meets the Arts. One SMARTS member, Steve Jobs' NeXT, has donated the use of one of their computers. Coates and his associates are also investigating the state of the art in virtual reality technology and mind machines.

Coates suggests that Lewis Carroll was "a highly ordered multiple personality." "Multiple personality disorder" is the usual clinical label for the syndrome. Coates has scrutinized primary sources and believes that Carroll had as many as 14 different personae, including the Victorian crone, the occultist/magician, the bureaucrat/archivist, the Oxford don, and, of course, the nine year old girl. However, don't expect this event to be a biographical piece about Carroll or to be full of the usual "Alice in Disneyland" resonances. Coates is using the labyrinthine psyche of Lewis Carroll as a take-off point for an exploration that could wind up going just about anywhere.

The project is a collaboration with the normally traditional American Conservatory Theater. It will showcase several exotic devices such as the human gyroscope to create the kind of stage magic George Coates is famous for. The show will open in early October at ACT's Geary Theater in San Francisco. ▲

"Alice Growing" One of Lewis Carroll's own illustrations from *Alice's Adventures Underground*, the original 1862 manuscript. Most readers are exclusively familiar with the classic Tenniel illustrations. The original illustrations by Carroll himself bear striking testimony to George Coates' contention that the young Alice was one of Carroll's multiple personalities. Compare with Rejlander's portrait of Carroll (1863), here superimposed on a maze designed by Lewis Carroll during the same period.



Introducing Future Media

Future Media covers the intersection of Computer, Video, Audio, Print, and Communications systems technologies. We'll fill you in on technological solutions that empower you in your quest. We'll help you define the system configuration to complete your communications pod. We'll evaluate products and alert you to developments down the line.

Get on track with the latest in CPUs, Add-On Boards and Accelerators, Video Camera and Recording Tech, Audio Reproduction and MIDI/SMPTE, MultiMedia Production Management, Computerized Videography Sourced Print Color Separations, and Computer Animation Platforms. And stay on board 'til the next junction: where Avant-garde meets Avant-tech.

With the arrival of the powerful new micro-processor chips, we are entering a revolutionary new era. Finally our interaction with machines will become positively "human" — more immediate and more intuitive. And technological feats that were capital-intensive, like animation, video, and voice recognition, are within the grasp of the ordinary Mac initiate. *Future Media* will help you find new tools, and permute & combine those tools, to make communication and creativity more wondrous than ever before. ▲



Allan Lundell

Taylor Barcroft

News Briefs

DESKTOP VIDEO REVOLUTION ARRIVES

Desktop color video on the Mac II has long been of dream of do-it-yourself video producers. Imagine being able to manipulate any video source just like the pros in megabuck studios. The problem until now has been that the Mac II was limited in its ability to handle color and incompatible with professional video standards. These new developments will change all that.

Finally, after years of development, the full simultaneous display of almost 16 million colors has been achieved. Apple is seeding their user community with 32-bit Quickdraw for the Macintosh to create a high resolution standard that will move our platforms into color hyperdrive. Combine this display power with conversion to NTSC and you have the last complete link to video production and presentation Nirvana.

If you are a Macintosh user, you may have to be patient for the 32-bit cards to reach the market in sufficient volume to drive down the price from a current \$4999 to a more reasonable \$1999 sometime next year. But who knows? Perhaps we'll experience card wars this fall — sooner than we expect. Once you see 32-bit color perform you probably won't consider 8-bit color a viable video option anymore. The high initial cost may be the only limiting factor. If you're a multimedia developer, you'll only want 32-bit color in the long run. But you can get started in the 8 and 16-bit world for a lot less.

COLORSPACE II: MAC VIDEO

A good example of where to start is with the ColorSpace II card. This plug-in card makes the Mac II compatible with NTSC (standard) video, which means you can now capture images from your video camera or digital VCR, touch up and edit them, and then view the results on any TV set or record them on a VCR. With the right software (like MacroMind Director or Aegis Showcase F/X) and accessories, you can also use the images to create animated presentations or still slides and photographs or for video editing. It can also substitute for your primary monitor video board because of its dual capability for delivering non-interlaced computer video or

interlaced NTSC video to a multisynch monitor *and/or* to a NTSC monitor or TV. The Desktop Video, DA that comes with this video card allows you to adjust the video and computer graphic combinations. The NTSC Digitizer DA lets you capture in 8-bit color or in any one of the three color guns or in composite monochrome. We shoot 256 grey scale by capturing with the green gun. Although this is not a real-time frame grabber, it's great for digitizing slides and photographs, as well as subjects who can hold still for a few seconds. Great for video production work since you can easily in/output from/to video/tape in conjunction with animation software. *Mass Micro Systems, 550 Del Rey Ave., Sunnyvale, CA 94086, 800-522-7979.*

16-BIT COLOR For \$2995, you can upgrade your Mac II with a *ColorCapture* 16-bit color real-time frame-grabber. This gives you simultaneous display of 32,000 colors and lets you save images from live TV or videotape. *QuickCapture* is their 8-bit 256 grey scale digitizer. The *PhotoMac* 24-bit color editing software allows you to edit 16 and 24-bit color within an 8-bit card environment. Edit 16-bit *ColorCapture* images with this program too. This kind of image processing power will allow you to create your own virtual realities by integrating photographs and still images from a variety of video sources into your very own new collage. *Data Translation Inc., 100 Locke Dr., Marlboro, MA 01752-1192, 800-522-0265.*

This field is exploding at present. Next issue we'll review more of these cards.

MORE BRAINS

If you want to do anything serious with a Mac II, you'll need lots of hard disk storage, which can be expensive.

The new high-speed 300/600 MB InnerCrate II-300/600FH hard drives offer a cost-effective solution at \$2785 or \$3845. (The 300 has run flawlessly in the making of this magazine.) *Crate Technology, 6850 Vineland Ave., Bldg.M, North Hollywood, CA 91605, 818-766-4001.*

VIRTUAL RAM

You also need more memory. You can fool your Mac II into thinking it's got 8 megabytes of memory so you can use MultiFinder to switch between programs on a 2MB Mac II. The trick: the new *Virtual* program makes a hard disk look like extra RAM memory. *Connectix Corp., 125 Constitution Drive, Menlo Park, CA 94025, 415-324-0727.*

SMARTER, CHEAPER MAC IIs

In May Mac developers from around the world found their way to San Jose. They met to study how to build on Apple's next system release and treated the press to an in-depth look at the changes being made in Apple's Mac operating system. System 7.0 will require a minimum of 2MB of RAM to run. Also: Apple Computer will release 25MHz Mac IIcx in Fall and a 33MHz IIx with six 20 MHz NuBus Slots and EtherTalk in January '90.

Here follow eight big changes with system seven:

32-Bit QuickDraw

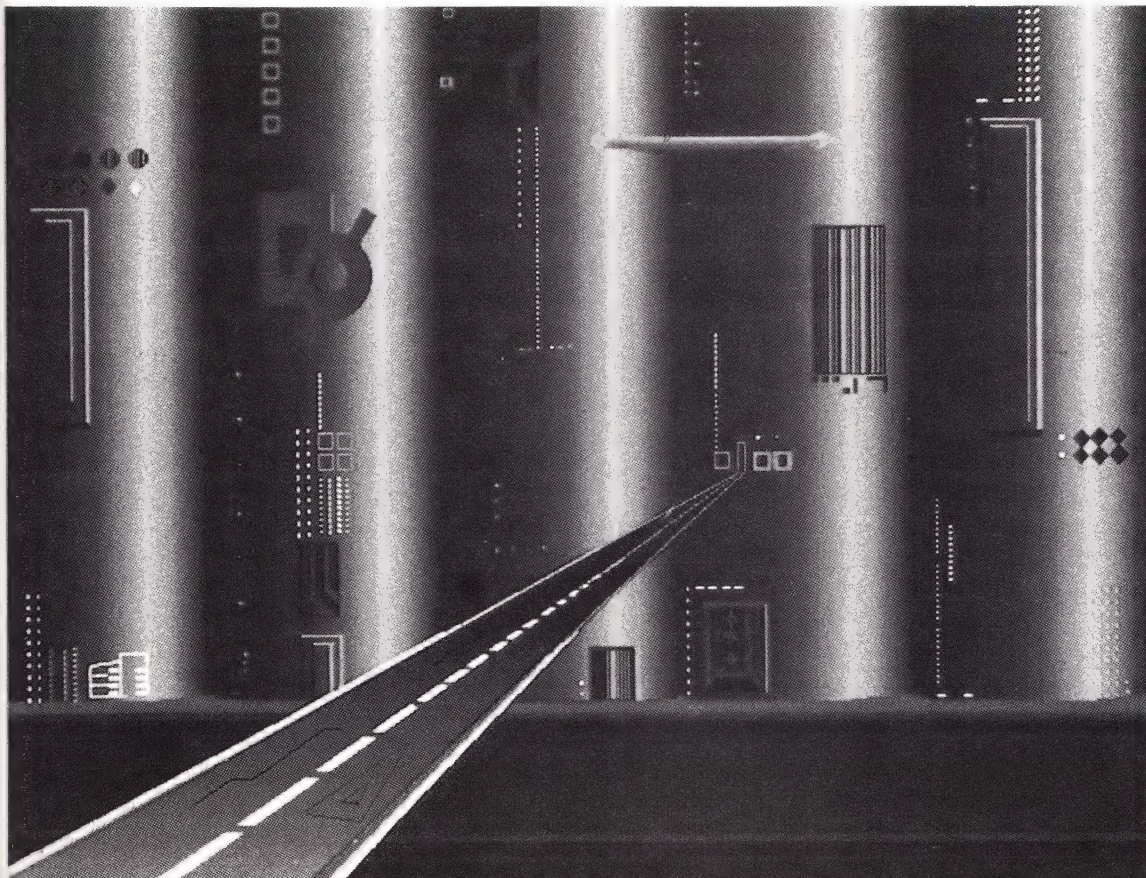
Unlimited Color! Until now you could only display 256 simultaneous colors with standard 8-bit monitor cards. Now you'll be able to display up to 16 million simultaneous colors thanks to Apple's new standard for maximum lifelike color. 24-bits are for the colors and the last 8-bits are for application overlay information developers can use in their programs.

Extensible Finder

Easier to use! Font/DA Mover, Chooser and Find File will all be integrated in the desktop. DAs and Control Panel devices (cdevs) can be opened by double clicking their icons on the desktop. Applications, documents and folders can be installed in the Apple menu.

"2019"

by Gregory MacNicol, Santa Cruz visionary computer artist and all-round Renaissance man. Executed with a 286 clone, Lumina and Crystal 3-D software.



New Print Architecture

More detailed and realistic laser printing of 32-bit QuickDraw images *and* halftone output from PICT files! LaserWriter driver 6.0 is now available. It will provide halftone output on monochrome Postscript printers from color and greyscale PICT images, reduce font querying time to printer hard drives and improve font handling. It also provides user-selectable alternate page sizes, supports color output on color Postscript printers, and supports printing of 32-bit QuickDraw images. Printing will be faster when using a printer with an attached font library hard disk.

New Outline Font Technology

WYSIWYG scalable screen fonts that are always sharp on the screen and print on paper exactly as you expect them to! Instead of resolving the font number conflict problems which have become so prevalent in the past two years, Apple is introducing yet another outline font standard for QuickDraw printers that will challenge Adobe's Postscript supremacy. While Apple is relying on developers to identify fonts only by name and not by their attached numbers, most don't, and the number conflicts will still be a problem. In fact, it appears that no thought has been given as to how to resolve this issue. These new outline fonts will use yet a third type of identity numbering system. Good news is: laser printers may become more affordable than ever without the need for Postscript.

Virtual Memory

Another big change is in the implementation of virtual memory which allows users to use part of their hard drives like RAM. This feature will only work on Macs with 68020s *and* 68851 Page Memory Management Units (PMMU) added and in all 68030 Macs (which includes a PMMU in the 68030 chip). As Menlo Park developer Connectix knows, there's big demand for this now. Apple's system software 7.0 will recognize up to 4 gigabytes of user definable hard drive space as virtual RAM.

Interapplication Communication (IAC)

Your programs will be able to talk with each other on the fly. E. G.: you change numbers on your spreadsheet and those numbers change in the word processing report *automatically*.

Communications Toolbox

The Macintosh is linking in and hooking up to the greater environment of local area networks and remote databases in a more robust way than was previously possible. This toolbox lets programmers and users design auto inquiries to remote sources as well as manual connections.

Like the way this publication looks? The clarity and higher resolution is largely due to the pioneering work in prepress technology of Cal Sierra Limited. Their desktop-to-printer final film systems integration defines the state-of-the-art. Check it out! Cal Sierra Limited, 1410 Monument Blvd., Suite 104, Concord, CA 94520, 415-689-1510, Fax: 415-689-2072.

Database Access Manager

Built-in links to CL/1 servers will provide for a consistent path from any application to any remote industry-standard host computer for data retrieval. Both SQL and non-SQL servers will be supported. Network Innovations, based in Cupertino, developed these hooks and impressed enough development leaders to now be an Apple subsidiary. *Apple Computer Inc., 20525 Mariani Ave., Cupertino, CA 95014, 408-996-1010.*

CYBERSCOPE

Imagine exploring inside a cell in 3D color. Now you can experience micro-cyberspace at the National Geographic Society's Explorers Hall in Washington D.C.

Cyberscope is a computer controlled robotic microscope that magnifies 1000 times and outputs to video tape or IBM PC. An ATronics International's (ATI) Professional Image Board (PIB) for IBM compatibles is being used by New Zealand ATI VAR Optech International, Ltd. as the computer imaging end of this new kind of microscope. It gives the user an interactive experience by allowing them to move the microscope into and around the subject. The Cyberscope has been enhanced into a rugged, extremely reliable multi-stage robotic mono microscope ideal for use by two to four operators plus up to ten spectators.

Cyberscope's a natural for infotainment. Because of the multisensory input, learning becomes a pleasure. It surpasses optical resolution with magnifications of up to 1000x. Color video graphics accompanying each specimen and digitized voice highlight exciting features as they are viewed.

It can capture and then edit those images to add text or combine different images. Over 32,000 simultaneous colors are available for display through the 16-bit PIB frame grabber/display.

ATronics Inc., 1830 McCandless Dr, Milpitas CA 95035, 408-942-3344

REALITY BUILT FOR 2

Watch out Autodesk! High tech genius Jaron Lanier and his company, VPL Research, is already proposing that virtual reality technology be used for two-way telecommunication. RB2 (Reality Built for 2) is being designed for the phone lines of the near future. Using VPL's computerized clothing, computerized 3D color goggles (see "Is it Live or is it Autodesk?" on pg. 16) and VPL's custom designed synthetic reality software package called *Swivel 3D*, RB2 will allow two people to do things "like build buildings or perform simulated surgery" together. (*Watch for a feature length interview with Jaron Lanier in the next issue of Mondo 2000.*) ▲

"Cray on a Chip"

by Taylor Barcroft

Micro Supercomputing Arrives —

The Intel i860™ Megaprocessor: More Than One Million Transistors, 64-Bit Bus for Parallel Processing, @ 40 MHz 120 MOPS, 33 VAX MOPS, 10 MFLOPS Double-Precision Linpack, 50,000 Gouraud Triangles/Second

It's Smaller, Better, Faster Now! The computing power of a *Cray* supercomputer will be accessible to PC owners for a few thousand dollars by the end of this year thanks to the Intel i860 Megaprocessor. Two million *instructions* per second (MIPS) is the high-end Macintosh IIx rating today. An IBM PC runs at .6 MIPS. By next year it'll be possible to soup-up your platform (read "computer") to 120 million *operations* per second (MOPS). That's a 6,000% increase in performance! It means the rapid diffusion of radically new and improved computers, monitors and software as well as vast improvements in the performance of existing equipment and software.

At a press conference in San Francisco on February 27, a demonstration of the chip's power, compared to a pair of so-called "RISC" and "SPARC" competitors, left no doubt we were witness to the unveiling of a cornerstone chip for the next generation of microprocessor platforms — platforms that could be created with add-on boards for all of today's computers. We saw an extremely complex 24-bit color graphic generated on the 860's platform in under 30 seconds while the other chips took ten to twenty *minutes* to perform the same screen refresh.

Among the many new microcomputing applications this chip will open up are medical imaging systems of unprecedented *live* display of all body parts in three dimensions (see FM report on DIGIRAY), real-time complex 3-D graphic reflection generation as you change reflecting objects' positions on the screen (*vis à vis* animation creation), and huge spreadsheet calculations, evaluations and graphic representation analyses. Others include computer-aided design, econometric forecasting, molecular modeling, computational fluid dynamics, structural analysis, and real-time interactive modeling and simulations. Supercomputing systems are used in fields as diverse as the aerospace, automotive, chemical and electronics industries, education, energy research, meteorology, graphics and film animation, and oil and geophysical exploration. Now the same power will be available to individuals in their homes and offices.

THE CHIP

This chip is a CPU that integrates the capabilities of a supercomputer and 3D workstation in one component. It contains integer, floating-point and

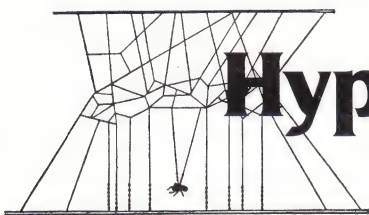
graphics units, a memory management unit, and instruction and data caches. The integer unit has a performance rate of 86,000 Dhrystone per second (at 40 MHz). The floating-point unit delivers a peak performance rate of 80 megaflops. The on-chip data bandwidth is one gigabyte (a thousand million bytes) per second, eliminating any throughput bottleneck. The wide 64-bit data bus pumps the data through part of the more than one million transistors at a phenomenal rate of 120 MOPS. At 40 MHz this throughput is achieved through a combination of 40 million integer operations and 80 million floating point operations. It can load two 32-bit instructions in the same clock cycle and send them simultaneously to integer and floating-point units for parallel execution.

It's a full microprocessor, not a coprocessor. However, depending on the application, it could be used as a coprocessor or as an accelerator to upgrade existing systems. It'll run all *portable* operating systems and Intel is developing a UNIX System V/4.0 specifically for it which it will then share with UNIX International and other UNIX standard setting organizations. A complete developer's starter system will sell for under \$25,000 complete with all the hardware and software a programmer needs to write for this chip. Developers will buy the 33 MHz i860 for \$750 (in 1,000 quantity).

AVAILABLE FOR PC'S BY CHRISTMAS

Add-in boards for desktop computer configurations will reach the market by this Christmas for under \$5,000. That makes the cost reduction of supercomputing on the order of a least one five hundredth (1/500th) what it has been up 'til now. It means that all those computing and communications dreams that were put on the back burner for want of chip power can be pushed to the fore now. It looks like we're approaching a kind of Singularity for the computer field as we enter the last decade of this millennium. We can't predict the effects but we know they'll be staggering. ▲

At deadline Motorola announced the 68040 chip with 1.2 million transistors will be ready for mass consumption by this year end. We predict it will play an important role in the rapid diffusion of desktop supercomputing. Look for a report on it in the next issue.



Hyperwebs

By Wes Thomas

PLANET EARTH — Two of the most revolutionary ideas of the century — artificial intelligence and hypermedia — are merging. Whatever develops will take the human imagination into unpredictable new dimensions.

MacSMARTS, a Macintosh "expert system shell" I co-designed with ex-Harvard psychology professor Dr. Richard Mansfield (of Cambridge-based Cognition Technology) is the first attempt to do this. It lets anyone create an "expert system" or "knowledge base" — packaged knowledge that offers advice that can't be distinguished from advice given by experts — Turing's test of artificial intelligence.

MacSMARTS combines AI and hypermedia. You can use it to offer advice — medical diagnosis or what to do when the reactor goes critical, for example. Advice can be words or pictures. You can click on a picture or word to get more information or explore *hyperwebs* of knowledge, which can include text, HyperCard stacks, pictures, databases, or knowledge bases. Or add your own links to create *new* knowledge. Think of it as intelligent media.

Virtual hypermedia Here's what I'm exploring now: what happens when you bring this to life by adding computer graphics, high-res video, and sound? Plus on-line communication over high-bandwidth global networks using CD-ROM, DVI, fiber optics, and other technologies? Then add neural networks — programs and hardware that simulate how the mind learns?

Imagine Vinge's *True Names* and Gibson's *Neuromancer* brought up to date, using an intelligent hypermedia program that offers more-intelligent-than-life, real-time synthesized participants., all created in cyberspace via 3D helmet display.

Result: the end of books, magazines, TV, education, libraries, computer databanks, conferences, and all other forms of dumb (non-interactive) information. As the adventurous cyberspace pioneers at the Cyberia research lab at Autodesk say, "Reality isn't enough any more."

HACK IN THE USSR: OPERATION CYBERGLASNOST

MOSCOW — Good morning. Your mission, should you choose to accept: prevent global thermonuclear war by getting U.S. and Soviet citizens communicating directly, forming joint business ventures, and freely trading information. You will be expected to open up communications in the USSR with desktop publishing and bulletin boards, connecting them with U.S. data networks. While you're up, do the same for China.

To assist you in this mission, the following operations are already underway:

- Superhacker John Draper, a.k.a. Captain Crunch, excited Soviet programmers at Moscow University late last year with tales of bulletin boards and free international E-Mail.

- The San Francisco/Moscow Teleport has set up satellite links for direct E-Mail communications between U.S. & Soviet companies, scientists, medical researchers, and other groups for \$200/mo. plus \$15/hr. connect time (415-931-8500).

- Personal computer pioneer Lee Felsenstein is forming Glav-PC, a trade center in Moscow to stimulate a personal computer industry there. (Goleemics, Inc., 2831 Seventh St., Berkeley, CA 94710, 415-548-0738.)

- Hypertext guru Ted Nelson has been invited by the Soviet Academy of Sciences to explain his revolutionary Xanadu concept to the USSR. With "xanalogical publishing," says Nelson, all information can be linked and readers become authors. Translation: control passes from the state (or the Western equivalent: publishers) to the people. Think of it as the ultimate glasnost.

Now here are your assignments:

1. Get computers to the USSR. Problem: the ruble can't be converted to dollars, so ordinary Soviets can't pay for computers in cash. Come up with some clever bartering schemes, such as trading programming services for computers.

Data: The U.S. Dept of Commerce now says it's OK to send PCs (and 286's with special approval, but not 386's), Apple IIs, and Mac 128K, 512K, or Mac Plus computers.

2. Form joint business ventures with the Soviets. That's how they prefer to work.

Data: Soviet programmers are excellent at AI, robotics, and animation.

3. Get the Soviets on free data networks, such as FidoNet (an international network for sending E-Mail messages between bulletin boards) and UseNet — the global academic idea exchange. And get them software, especially public-domain communications software.

Data: UseNet is a global communications network between universities and corporations set up by computer hackers. Many scientific and technical papers are actually "published" on UseNet long before formal publication, so this would theoretically plug the Soviets into what's happening in the real world a lot faster.

Paranoia footnote: UseNet connects to the U.S. Government-backed Internet, where 6000 computers were zapped last November by viruses.

MEDIA MELTDOWN

REAL WORLD — Meanwhile, the revolution continues. Paperwork and offices are out. The new class struggle: **real-timers** (who use fax, electronic mail, laptops, cellular phones, and voice mail, work anywhere and anytime, record all their contacts on computer files, and can respond in seconds) vs. people who work in factory-style offices, send letters, and think in days or weeks. See cover stories in *Fortune*, Oct. 14, 1988 and *Business Week*, Oct. 10 for what this all means.

Wait — it gets better (or worse, depending on what side you're on). By late 1989, real-timers will start using miniature pocket computers (Poqet Computer will offer the smallest), eventually with built-in fax, modem, and cellular phone. It will be all over for turtle-paced non-real-timers. To

paraphrase Ken Kesey, either you're on the real-time bus or you're off—and out of business.

WATCH FOR THESE OTHER REAL-TIME BREAKTHROUGHS:

- **PHOTOCOPIER PUBLISHING** Intel's Visual Edge system for the PC can create near-photographic-quality laser-printed images. Explains Intel's Wynn Smith: "Now you can bypass publishers and commercial printers and print your own instant custom magazines, newspapers, and books, with each publication different for each reader, complete with photos."

- **INSTANT COLOR PUBLISHING** Color printing used to mean expensive color separations and printers. IMAGELAND (911 Westwood Blvd, L.A., 90024, 213-208-7877) is about to change all that. You can walk in and create instant, low-cost "limited edition" color publications, tee shirts, posters, whatever. Coming soon: instant high-quality color separations for magazine-quality reproduction.

- **INSTANT VIDEOS** Now anybody can produce their own instant TV shows, says Alan Rogers, founder of the International Camcorder Association (847-A Second Ave., NY, NY 10017, 212-490-1665). You can even rent them anywhere (one Maui company has 350 for rent). Go ahead, bypass the TV networks. Join the global village and see the world.

- **SMARTV** Wasting time watching dumb TV shows? Blair Newman has a solution. Using a central computer that records your interests, SmarTV — a combination VCR, robot tape changer, and PC — knows when a program you're interested in is on and automatically records it. Whenever you please, you can pick interesting shows from a juke box-like menu, zipping forward at high speed to bypass the boring stuff and commercials. (Metaview, 2269 Chestnut St., S.F., CA 94123, 415-441-6962.)

- **VIDSCAN** A new way to deliver a 300-page video magazine to millions of people in 30 seconds for fractions of pennies per person (see page 32 for more details).

- **CYBERVID** *VidScan*TM developer Allan Lundell says: using the same tech, create your favorite five-second live video vignette (or full magazine or newsletter or whatever) and upload to the **CyberVid**, a bulletin board that will store and publish video data. Eventually, look for a **CyberVid Grid** — global video bulletin board.

It's total media anarchy!

Wake up! Groupthink publishing, lockstep offices, and mindless mass media are over. It's OK now to create your own reality.

WORLD BRAIN SEIZURE?

PALO ALTO — As computer networks get larger, they can show "wildly unpredictable behavior," says Bernardo Huberman, research fellow at Xerox's Palo Alto Research Center. Computer networks are already running the world banking system and forming a vast "computational membrane" around the globe. As this world grid becomes more complex, "spawning networks" resembling biological organisms will evolve in which work to be processed will automatically seek out and migrate to computers available at the moment. At some point, Huberman warns, this complex "computational ecosystem" could "act strangely" and lock up or break down. Paranoia footnote: spawning networks are being considered for the SDI "Star Wars" program.

HACKER UPRISING

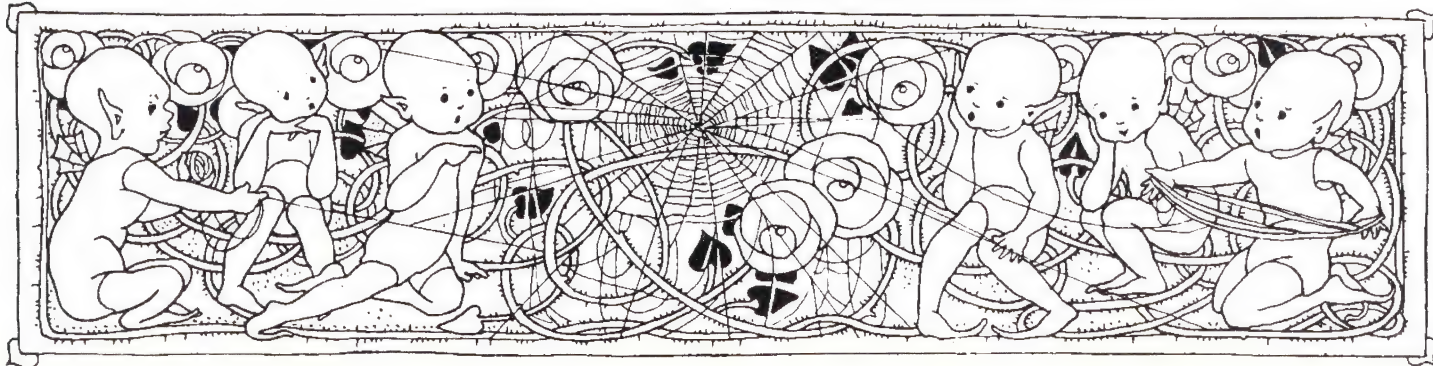
CAMBRIDGE — Almost 200 hackers picketed software giant Lotus here in May, protesting its "look and feel" lawsuits against companies developing similar software user interfaces. Chanting "Hey hey, ho ho, software tyranny has got to go," the harried hackers urged a total boycott of Lotus, Apple, and Ashton Tate software. "If these monopolists are allowed to make law through the courts, it will hobble the software industry," said protest organizer/superhacker Richard Stallman. "Programming user-interface innovation will be totally paralyzed." Stallman has set up the League for Programming Freedom (545 Tech Sq, Cambridge, MA 02139) to fight back, with the support of AI pioneer Marvin Minsky and other leading computer scientists.

TOUR THE UNIVERSE?

NEW YORK — Here's one interesting new reality: We can't go to the universe (yet), so the universe has come to us. Right now, it's in the middle of Manhattan's garment district.

Carl Sagan and Isaac Asimov saw it and raved. Awad's **Model of the Universe** is a meticulously-crafted, precisely-scaled model that shows what the universe actually looks like, in three dimensions. It uses 75 cubes that step you, in powers of ten, from a point on the earth on out to the entire universe. Hopefully, it will soon be cloned in museums and planetariums worldwide. *Data: Carol Rosin, 4053 San Rafael Ave, Los Angeles, CA 90065.*

Meanwhile, back on earth, the most important news in history just broke: room-temperature nuclear fusion. Translation (if it's true): Free energy. Global abundance. The end of scarcity mentality (war) and polluting fuels. It's OK to think big again. Cool the deserts. Grow pesticide-free food at the North Pole. Redesign the solar system. Pollinate the universe. Anything goes. Pass the word. ▲



DTV - DeskTop Video: A Future Media Special Report

by Allan Lundell

EVOLUTION IN ACTION

Desktop Video may someday be seen as a more powerful and influential communications tool than written or spoken language, a real nexus point in the evolution of communications for our species. A synthesis of technology from the audio, video, and computer worlds is creating a "multi-sensory communications tool" that increases the bandwidth of our everyday long distance contact.

Jan Lewis, communicator and high tech industry analyst says about Desktop Video: "It's a more total communication between human beings; occupying more and more of your eyes, ears, hearts, and minds."

Says Jan, "People think that the printing press was invented and then people started printing books and reading. But the truth of the matter is, just because the printing press was invented, that didn't mean people had the "technology" for reading. Literacy skill, the software, had to be taught before the books or presses could be useful.

"It took about a hundred years for the technology of reading books to evolve. Now, the technology for reading video, the VCR, is reaching a critical mass. Nielson and Arbitron have reported that home penetration of VCR's has now exceeded the home penetration of cable television. So the momentum that took a hundred years to get the book, the printed word, off the ground is happening now for video."

Video is the *lingua franca* of the modern world. Even little tiny villages in India and Eskimo camps in Alaska have received video communications. Everybody understands it, and what it conveys is immediate, requiring no training.

The evolutionary direction for these new communications tools was most simply stated by Nobutoshi Kihara, creator of Japan's first tape recorder, transistor radio, Betacam and 8mm video: "They will be smaller, better, cheaper. Ultimately, everybody will have one!"

REWRITABLE OPTICAL DRIVES

New optical disks that are being introduced on the NeXT machine should greatly improve the performance and capacities of DTV systems. These read/write magneto-optical drives promise to replace hard disks, offering much more storage capacity, inexpensive removable data cartridges, and soon-to-be competitive pricing.

The "floptical" cartridges resemble overgrown 3.5 inch floppy disks, with rigid shell and shutter door. The optical platter within looks like a CD diskette. Embedded in the platter is a layer of reflective aluminum backing overlaid with a magneto-optical substrate. The platter rotates at

about 3,000 rpm, comparable in speed to a hard disk drive. Each cartridge is capable of storing between 250 and 500 megs of data per side.

The DTV Connection

Optical disks will allow direct digital storage, access, and manipulation of video images on your personal DTV system. This parallels what is now happening with sound in the music world. With music, once everything is in digital format and you are ready for distribution, you say, "Okay, we'll dump out to vinyl, we'll dump out to tape, and we'll dump out to CD. With desktop video we'll dump out to 35mm film, VCR cassettes, CDV's (Compact Disk Video), and optical disks."

Present Limitations

Availability, price, speed of data access, and compatibility are the major limitations of the optical disk at this time. I predict availability will loosen up by the end of '89. Data access times on the newest announced drives are comparable to fast hard disks (dropping from the present 96-millisecond to 19-millisecond seek time) and pricing will drop from the present \$5K to \$3K within a year.

IMAGE ENHANCEMENT TOOLS AND SPECIAL EFFECTS

Image enhancement tools allow you to take a fuzzy or distorted image and improve its sharpness and definition. Image-editing software can sharpen, blur and blend an image in myriad ways. Images can be flipped, rotated, scaled, slanted, or distorted.

Currently used for restoring photographs, image enhancement technology may also prove valuable in improving selected video images originally made on sub-broadcast standard consumer-oriented video formats (VHS, VHS-C, 8mm).

By literally painting on video images, a special quality can be conveyed, giving them a look never before possible. *The Studio*, a Desktop Video facility in Santa Cruz, California is using image enhancement for conveying shamanistic experiences.

"The psychotropic glow created by peyote, for example, is a real expensive effect in Lucas terms," claims Dan Mapes, founder of *The Studio*. "With this gear we don't need a \$5 million budget to create these effects. We can now do things for \$50,000 that are completely outrageous!"

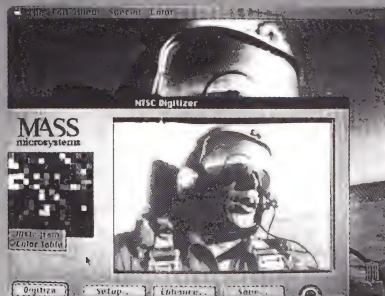
"What I want to do with such tools," says Brett Leonard, a Santa Cruz-based feature film producer, "is create grain stories. In the granular structure of the image, which is below the conscious threshold awareness of the audience, you have certain coarseness changes and patterns being formed that can work either dynamically or counter-dynamically with what is occurring in the film at that moment. By linking these grain effects with upper harmonic and ultra-low harmonic three-dimensional sound placements, you can create three-dimensional imagery in the mind's eye of the viewer, done with fairly conventional two dimensional technology."

(continued on page 30)

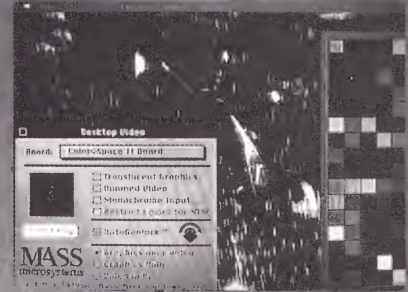
Desktop De Mille.



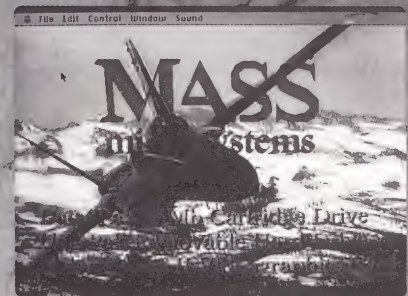
Graphics and animation over live, full-color video



Full-color digitizer captures video



Comprehensive, easy-to-use software



Special effects such as translucent graphics

"Best New Macintosh Desktop Video Product"

— Mac user editors' choice award 1989

ColorSpace II™ DESKTOP VIDEO PRODUCTION

So you wanna be in pictures. Well, with our ColorSpace II videographics card we'll put you one step closer to creating your own multimedia masterpiece. ColorSpace II allows you to produce full color, professional quality videotapes and multimedia presentations in-house, inexpensively, in minutes. Cecil B. should have had it so good! It's easy to install, uses only one slot in your Mac II and is fully compatible with all standard Macintosh II applications including: HyperCard, SuperCard and Director. Use the ColorSpace II card with *or in place of* your Apple Video card, *and* in conjunction with other Macintosh II cards. ColorSpace II is fully NTSC-compatible and works with a wide range of standard consumer and professional NTSC and RGB video equipment. In addition, it supports 256 color, flicker-free graphics on RGB multisync-type monitors.

ColorSpace II's genlocking lets you synchronize your Macintosh graphics to almost any VCR, videodisc, or other standard video signal. Then overlay titling or graphics — mix the two signals together — and display or record the results. In no time you'll be creating eye-popping fly-thru logos and animations over live video. Other advanced features such as translucent graphics and dimmed video background are readily selectable with ColorSpace II's easy-to-use software. And, unlike the competition, ColorSpace II has full RGB-quality mixing of the video and graphics for superb, simultaneous RGB and NTSC video output. ColorSpace II can also capture (digitize) video images from standard NTSC or RGB video sources in as little as 1 second for full color. So if you want to be in pictures get ColorSpace II; get an agent and get famous!

Aerial Film & Video, Inc.



Call 800-522-7979 for a dealer near you and to order your video production. In California, call 415-351-1200. In Canada, call 416-291-1200.



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Digital Darkroom from Silicon Beach Software is one of the first commercially available image enhancement software packages. Retailing for \$295, it can manipulate up to 256 gray levels on the Mac II and is excellent for restoring old monochrome photographs. The first color image enhancement package is PhotoMac, available since December 1988 for \$395 from Avalon Software. PhotoMac supports 24-bit Mac II color, and recognizes 8-bit or 24-bit PICT, PICT2 and TIFF files.

FROM PERSONAL COMPUTER TO PERSONAL CONTROL

Most people associate the abbreviation "PC" with "Personal Computer." With Desktop Video, our intrepid linguistic updater, Jan Lewis, suggests that "PC" now refer to "Personal Control." Says Jan:

"Soon, with the ongoing breakthroughs in digital storage and memory technology, even the video images will be in your computer. Once that occurs, you could do the same things to video as you have done with your desktop publishing or word processing software — cut and paste, special effects, what-if analyses, trying out different scenarios, etc. And once you have that kind of control, it will become the average person's method of communication, the same as desktop publishing is becoming today."

Dan Mapes of The Studio agrees. "We are going to see a punk revolution like the one presently happening in sound. Everybody will just say, 'Give me the Gear!! Forget the studios, just let me at it!' And presto whammo!! Massive numbers of people will be putting out video CD's! Distribution will be easy, following in the wake of the presently expanding audio distribution. Fiber optic cable companies are opening up, the phone companies are developing their own cable, and all of them are hungry for material."

WHAT APPLE'S BEEN DOING ABOUT DTV

For the last two years, Apple Computer has had Jim Armstrong, their multi-media evangelist, developing a new market called *multi-media*. Jim has been working with third party developers, encouraging them to create products and even working on product development with them.

So far he's worked with Macromind, AST, Rasterops, SuperMac, Mass Micro, Computer Friends, and Julian Systems, facilitating the development of video boards, video editing systems, digital audio interfaces, etc., all designed to interlink with the Mac II to form a functional multi-media system. Says Jim:

"I see that these companies get ample hardware and software as necessary to allow them to do product development. I also work with their tech support people, if they have any problems."

Once a product is complete, he turns it over to one of Apple's third party marketing groups. They will help sell the product through Apple Ad campaigns and by demonstrating it at the Apple booth at various professional trade shows.

I asked Jim where he saw DTV going, from his corporate Apple vantage point.

"Every company will have its own in-house DTV system. It will be used for creating video brochures, point of purchase displays, and training tapes. As of now, we are working with Boeing, Steel Case, and about ten Fortune 500 companies, all using DTV quite extensively. And those are just the test cases. We will roll it out to the whole Fortune 500 in the near future."

At the present time, DTV is being used by pioneers and innovators of the high tech world. Apple's Armstrong is working with HBO, Lucasfilm, and Zoetrope, helping them automate the feature film production process.

"Video production people are really interested because for them it is a big time and money saver. They can go from scripting to end product on one machine. They can have these machines networked together for sharing files, doing storyboards, the whole pre- and post-production phase of moviemaking."

At his home, Jim is working on a remote control interface using Hypercard and one of Steve Wozniak's Cloud Nine universal remote controllers. This allows him to control any equipment using a remote via his Mac II.

"This technology has a real future in the low end. I use it at home. I'm also working with MIDI for controlling lighting. Anything plugged into an AC outlet can be controlled with MIDI. Through the Mac, I can switch outlets on or off or just dim them. You can even dim a slide projector with this. Potentially every Mac II can be a multi-media station. Just add on a couple of pieces and you're ready to go."

MARC CANTER INTERVIEW

One of the best-known DTV pioneers and a creator of the hyperfamous VideoWorks, a Mac-based user interface for computer animation and video information. He is Chairman of MacroMind, Inc, a multimedia software company in San Francisco.

FUTURE MEDIA: How to you contextualize DTV?

MARK CANTER: Desktop Video is a big chunk of multimedia, which is this nice generic thing saying "sound, graphics and video." The key thing with DTV is the resolution of the conflict between RGB technologies, which is the way you look at a computer screen, and NTSC technologies, which is VHS, Beta and the whole video world.

FM: What is the conflict?

MC: The success of DTV is based on the quality level of the hardware conversion. I claim that the real reason the AMIGA wasn't more successful was that their NTSC quality wasn't that good. It was pretty good, good enough for some wacky special effects on the *Max Headroom* TV show. But it wasn't good enough to go on the actual master tape that *was* *Max Headroom*. It had to be cleaned up before it was ready for broadcast.

(continued on page 155)

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Just like the printed Whole Earth Catalog, the electronic version contains more than 3,500 entries on a vast array of subjects. Each entry includes a lively review, selected excerpts, and access information (where to get it).

First published in 1968, the Whole Earth Catalog was developed to be a sourcebook for modern times. In its pages, it has recommended an astoundingly diverse assortment of books, magazines, and mail order catalogs that offer "the best available across the widest spectrum of usefulness."

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CD-ROM. And it runs under HyperCard®. So it offers features that are just not possible in a printed-and-bound catalog.

A catalog you can listen to.

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It's a browser's paradise.

Thanks to HyperCard, you can move quickly and easily from

subject to subject. It's far faster than flipping back and forth to the index of a book. Best of all, you don't need to know anything about HyperCard. It all just flows naturally.

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Table of Contents

The Electronic Whole Earth Catalog has been expanded to include new material on communications, technology, and computing, taken from Whole Earth's newest publication SIGNAL and the Whole Earth Review. In all, there are over 3,500 entries in the following categories:

Whole Systems

From Astronomy to Plants and Fungi

Place

From Farming Philosophy to Indoor Gardening

Community

From Local Self-Reliance to National Politics

Household

From Architecture to Water Use

Craft

From One Highly Evolved Toolbox to Weaving, Spinning, Dyeing

Livelihood

From Economics to Working at Home

Health

From First Aid to Gathering and Preparing Food

Nomadics

Vagabonding to Sea Kayaking

Communications

From Language to Visual Design

Media

From Publishing to Video to Computers

Learning

From Toys and Storytelling to Mysticism and Science

Music

From Musical Recordings to Music by Mail



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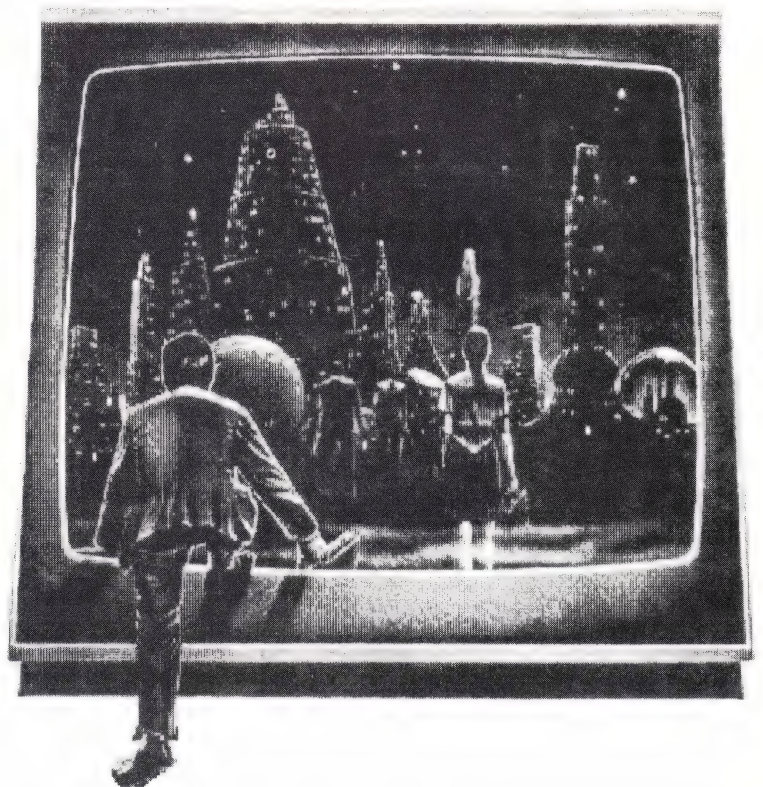
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Please fill out the form on the next page and send it to us with a self-addressed stamped business envelope.

Future Media — Inside VidScan
PO Box 11632, Berkeley CA 94701

FREE Subscription to **Inside VidScan**TM

We need the following information about who you are, the kind of communications pod you have (or plan to have), the broadcast stations you prefer, and the cable system you do (or don't) subscribe to. This information will be compiled in an anonymous database for potential advertisers and transmitting stations to know you're out there wanting to participate in this new medium.

What is your primary occupation?

- ☐ 1. VCR brand and model number (on the back manufacturer's plate):
- ☐ 2. TV brand and model number (on the back manufacturer's plate):
- ☐ 3. Computer system brand and model name: ☐ Amiga ☐ 2000
☐ Macintosh ☐ Plus ☐ SE ☐ SE/30 ☐ II ☐ IIx ☐ IICx ☐ Atari ☐ 512 ☐ 1024 ☐ 4MB
☐ IBM or clone ☐ 8086/8 ☐ 286 ☐ 386 ☐ 486 ☐ other what?
- ☐ 4. Do you have a data modem? ☐ yes ☐ no
At what maximum speed? ☐ 1200 baud ☐ 2400 baud ☐ 9600 baud ☐ 19.2 KBaud
- ☐ 5. Do you have a fax? ☐ no ☐ yes: ☐ dedicated ☐ AppleFax Modem ☐ BackFAX Software
- ☐ 6. All Night (or late night if none go all night) broadcast TV stations in the UHF bandwidth (channels 14-85) serving your household: Call Letters: _____ Channel #s: _____
- ☐ 7. Name, address and phone of the cable television system serving your household and satellite channels provided on basic that you like: _____
- ☐ 8. I subscribe to that cable system? ☐ no ☐ yes
If so, do you pay for any movie channels? ☐ no ☐ yes
If so, which ones? ☐ Showtime ☐ HBO ☐ Cinemax ☐ The Movie Channel ☐ Which others: _____
- ☐ 9. I plan on buying a new (or used) computer, television and/or VCR in the next 12 months.
☐ yes ☐ no
If so, which ones are you considering for purchase? ☐ Amiga ☐ 2000
☐ Macintosh ☐ Plus ☐ SE ☐ SE/30 ☐ II ☐ IIx ☐ IICx ☐ Atari ☐ 512 ☐ 1024 ☐ 4MB
☐ IBM or clone ☐ 8086/8 ☐ 286 ☐ 386 ☐ 486 ☐ other what?
- ☐ 10. Do you plan on buying any video accessories, computer peripherals and/or software in the next year? ☐ yes ☐ no
For which platforms? ☐ Macintosh ☐ IBM or clone ☐ Amiga ☐ Atari ☐ other what?
If so, what type of products are you considering for purchase?
Hardware: ☐ hard drive ☐ laser printer ☐ monitor ☐ 32-bit color/grey card ☐ digitizer card
☐ modem ☐ CD-ROM player ☐ scanner ☐ other If so what?
Software: ☐ graphics ☐ publishing ☐ video ☐ word processing ☐ accounting ☐ tax prep
☐ animation ☐ fonts ☐ spreadsheet ☐ communications ☐ CD-ROMs
- ☐ 11. Do you plan on renting and/or buying video tapes in the next year? ☐ yes ☐ no
If so, what type of videos are you considering for rental and/or purchase?

Yes, we know this is a lot to ask. But we're breaking new media barriers here. We need your help in convincing advertisers (a notoriously monolithic lot) that they should buy a frame or two. This will enable us to capitalize the production and transmission costs.

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The PicturePhone/Camcorder Connection

by Allan Lundell & Taylor Barcroft

Sure, it's got a long way to go before the Jetsons would use it, but after all, it is only 1989.

Panasonic's *Visual Telecommunication System* (model number WG-R2) is a \$450 consumer-priced picture phone that sends still-frames of low-resolution black and white video over the phone lines.

Black and white? Still-frames only? Low resolution? \$450? Who is Panasonic kidding in a world of cheap, full-color, broadcast-quality motion video?

Well, over the last few months we've explored the ins and outs of this new telephone technology — carrying a pair of these Panasonic videophones wherever we went, calling one another from remote locations — and the joke's on you if you choose to ignore it. This is a useful communications tool with some rather interesting applications, especially when combined with a camcorder.

Like walkie talkies, you need two of them to have serious fun. This will cost you about \$900. What do you get for the money? In terms of hardware, you get a little gray plastic box about 8" wide x 10" deep by 8" high with built-in monochrome monitor and CCD camera. The most exciting feature is this: *You can both record and play back frames with your camcorder over the video phone.* This feature makes it all worthwhile. Now it's easy to send interesting and useful images over the phone lines, for both business and fun.

After demonstrating the Panasonic VTS system to a few friends, we had a brainstorming session on what improvements we'd like to see in the design. Even though we found the videophone to be extremely useful, we humbly suggest the following innovations, not necessarily in this order:

A built-in full-feature telephone Integrate the videophone with the telephone.

An onboard quality speaker-phone Besides being more comfortable and natural, this feature goes well with video. Holding a handset looks dumb on camera. A high quality unit would use equalization techniques for improving phoneline transmission and a combination of omni- and uni-directional microphones for voice pickup. Stereo sound would be a real bonus.

A higher resolution color image The higher the better, NTSC quality at least. But please, don't stop there!

A larger, more compact imaging system A 9" or larger color LCD flatscreen would be an improvement.

A camera lens with macro and zoom capability This will allow close-ups of faces and written material. Extremely useful. It would also be nice to be able to switch off the "mirror effect." (i.e.: the image reversal)

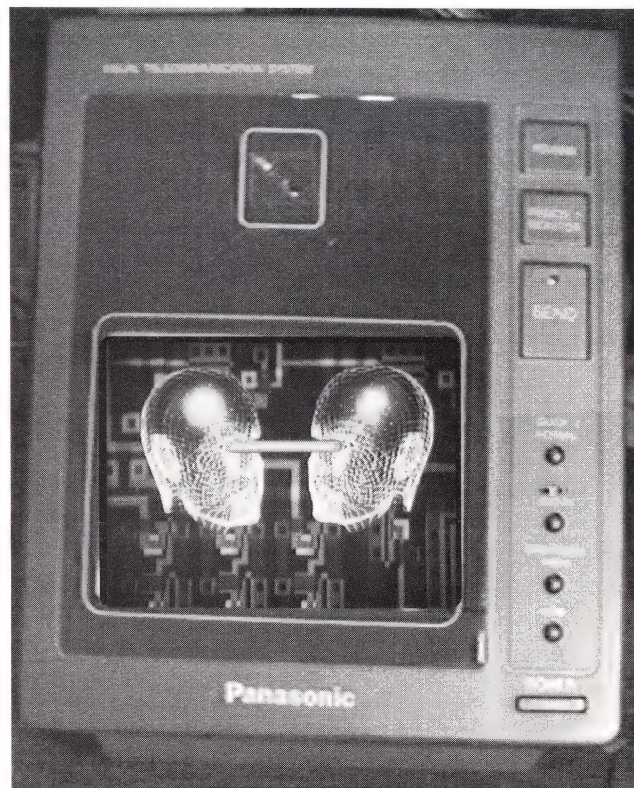
Connecting a camcorder to the "video in" jack on the existing models will give you this feature.

Built-in image processing software This would allow you to modify video images before and after transmission. Not just a great feature for graphics professionals but fun for playing with your friends' images too. An image processing program can also be used as a kind of electronic makeup, allowing you to "touch-up" your own image before it's sent. Video output from any personal computer to the phone's video input can give you this capability now.

A built-in VCR Useful for taping and playing back videophone conversations, the VCR can also serve as a video answering machine and remote access TV. 8mm is a good portable format for such a device (like the new Sony Watchman) VCR. The VCR will be most useful once real-time video is achieved.

A real-time video signal This feature, of course, is the holy grail of videotelephone transmission. For live two-way television, we suggest using two phone lines simultaneously, better signal compression algorithms combined with distributed intelligence for image transmission and generation. Reducing resolution for an increased speed of transmission time approximating real-time animation may also be acceptable. Substantial progress is being made in this regard.

Obviously, the Panasonic unit is an early evolutionary development. It is however light, portable, durable, and enormous fun! Like two kids who just got walkie talkies for Christmas, we've been carrying our units *everywhere* — conventions, parties, hot tubs, bar mitzvahs, sushi bars, the race track . . . ▲



GREGORY MACNICOL

U-Force Takes Control of Nintendo

by Allan Lundell

"Any game you thought you mastered is going to be a lot more intense and a lot more fun," said a spokesperson from Broderbund. U-Force is the name of a new input controller designed for the Nintendo Entertainment System. It's a revolutionary controller that eliminates all physical contact between the player and the machine by detecting the exact motion, velocity and relative position of the player and transferring the information instantly into onscreen action.

Nintendo demonstrated three of their hottest games with the U-Force controller, Mike Tyson's *Punch-Out*, *Top Gun*, and *Rad Racer*. *Punch-Out* requires the player to actually "punch" the air within the special U-Force grid. This translated into punches thrown by the player against Mike on the screen. *Top Gun* demonstrated how subtle thumb movements are rendered into machine gun or missile fire. *Rad Racer* showed how high speed car racing is possible via simple hand motions.

The player doesn't have to touch, wear, or hold anything in order to interact with the machine. U-Force is able to do this by generating a three-dimensional infrared light grid that picks up and measures all movement within its field. Nintendo claims that the new controller will work with many of their games. To appease players who feel more comfortable with a traditional arcade hand grip, the U-Force system comes with three accessories, including firing handles and a T-bar. You can play three ways—using only your hands, just the firing handles, or the handles with the T-bar.

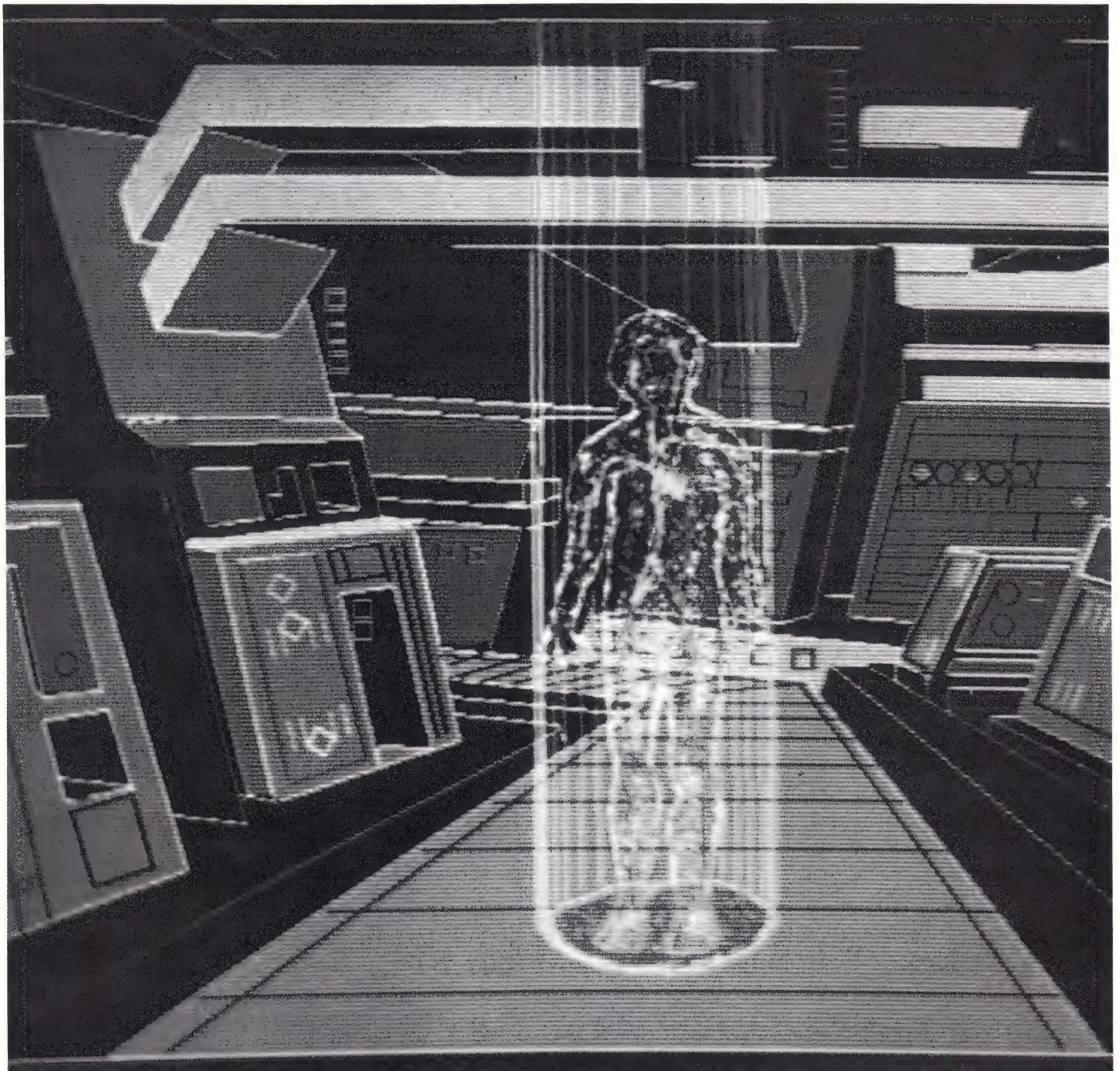
Broderbund will be marketing U-Force in this country. They claim that exactly how U-Force works is a proprietary secret, with two patents still pending on the controller's circuits and sensors. They plan some summer shipping of the unit with a massive TV ad campaign and distribution in the fall. Retail will be \$69.95. ▲

Broderbund Software, 17 Paul Drive, San Rafael, CA 94903-2101, 415-492-3200



Radio Shack

meets



GREGORY MACNICOL

STAR TREK

In the mid 60's, British neurophysiologist Sir John Eccles persuaded the Pope to host an international conference on the mind/body problem. The book that resulted from this congress of brain scientists and philosophers — *Brain and Conscious Experience* — still remains a high-water mark of informed speculation on the vexing question of how consciousness manages to inhabit the fistful of quivering meat inside the skull. In the twenty-odd years following the Vatican conclave our knowledge of the brain has increased immensely, but the mystery of human consciousness has hardly been touched.

In 1963, Sir John Eccles received the Nobel Prize in Medicine and Physiology for his part in elucidating how nerve cells communicate with one another: they do it with drugs. Each nerve cell is a separate entity. Nerve cells never meet and fuse together but always maintain a definite gap — called the “synapse” — between one another, a gap too large to be bridged by electrical signals alone. Instead, when a nerve is excited, its extremities are motivated to emit tiny packets of chemicals — called “neurotransmitters” — which diffuse across the synaptic gap to excite or inhibit the firing of adjacent nerve cells. Since Eccles' discovery of chemically-mediated synaptic transmission, more than a dozen different drugs have been found which play the part of neurotransmitters in different parts of the brain. To handle the details of its vast informational traffic, the human brain employs a veritable pharmacy of exotic transmitter substances.

In a recent article (John C. Eccles, Proceedings of the Royal Society 227B 411, published by the Royal Society of London), Eccles proposed a model for human consciousness based upon the way in which these chemicals seem to be released into the synaptic gap. In the human cortex, a rather large number of synapses, perhaps as many as one hundred million, respond on a probabilistic basis to neural excitation. That is, when they are electrically excited by a nerve impulse, these neurons may or may not release a single chemical packet with a probability of about 50%. Furthermore, Eccles argues, these packets are so tiny

A New Electronic Artificial Awareness Module

— 10 times smaller than a wavelength of light — that quantum uncertainty rather than classical thermal agitation governs their release or retention. Eccles proposes human awareness is a quantum effect, that an immaterial mind incarnates into matter right here by willful manipulation of these special quantum-unstable synapses, artfully masterminding the concerted release of thousands of neurotransmitter packets much as a skilled musician — Eccles' metaphor, not mine — manipulates the keys of a piano. Mind as a kind of spirit-generated music.

The speculation that matter and mind intersect at the fundamental quantum level is

as old as quantum theory itself. What Eccles has added is the specification of a particular neural mechanism whereby quantum processes can be directly implicated in the brain's otherwise totally Newtonian operation.

In the early 70's, the author and his colleagues, notably physicist Saul-Paul Sirag and computer scientist Dick Shoup, designed and built electronic devices that linked processes on the quantum level to information flow on the human scale. The “metaphase typewriter” churned out reams of pseudo-random English-like text whose ultimate source was not a computer algorithm but the quantum-random decay of radioactive thallium atoms.

The metaphase typewriter and “quantum metaphone,” a quantum-random speech generator driven from the same isotopic source, were conceived as open channels to the void, “empty heads,” as it were, craving to be occupied by any passing discarnate entity. In our quest for a suitable occupant we exposed the metaphase typewriter to seance chambers, world-class psychics, amateur PK groups, and the spirits of recently deceased colleagues. Although many curious and unusual incidents occurred during the few years of metaphase research, never was the typewriter witnessed to be occupied, unequivocally, by a discarnate correspondent. As originally conceived — an electronic clear channel for discarnate spirits — the metaphase gambit must be judged a failure.

However, one might imagine that the metaphase project

failed not because the quantum consciousness hypothesis was wrong but because a radioactive source is not a suitable quantum transducer for wandering minds. For one thing, a radioactive atom, unlike a neural synapse, is not reusable. Once it decays, that's it. For a second generation metaphase typewriter project, I propose to use quantum-random sources more like neurons than like neutrons.

What we need is an electronic "black box" with the following properties. This so-called "Eccles gate" would have three leads: an input line, output line, and bias line.

***The essential component
for a new race of self-conscious robots,
PK-operated household appliances,
electronic spirit mediums***

The input to the Eccles gate is a series of positive square-wave pulses, the electronic analogue of neural impulses. The gate responds only to the rise and the fall of each square-wave pulse. When the input jumps positive, the output also goes positive 50% of the time; otherwise the output remains at zero. When the input signal jumps down to zero, the output goes to zero 100% of the time. The percentage of times the gate actually fires is adjusted to 50% by varying the voltage on the bias line. Changing the bias voltage will allow the synapse to "learn," by reinforcing desired responses, suppressing others. An essential feature of the Eccles gate is the requirement that the firing of the gate be determined (or "undetermined," if you will) by a fundamental quantum process, not by thermal agitation or some other kind of classical randomness. When stimulated by a regular series of positive pulses at frequency f , the Eccles gate produces a quantum-random sequence of

positive pulses at an average frequency of $f/2$.

In practice, many Eccles gates would be operated in parallel producing complex patterns of "random" bytes, suitable for takeover by local disembodied mental entities. Once we have learned how to embed it in classical electronic circuitry, the Eccles gate could become the essential component for a new race of self-conscious robots, for PK-operated household appliances, for electronic spirit mediums, quantitative augmentations of human awareness, perhaps even extraterrestrial radio receivers. (Why send your body by rocket, when soul travel is so much cheaper?) This column should be viewed as a call for the realization of an electronic analogue to the quantum-random chemical synapse, as a challenge to some clever solid-state wizard to put together the world's first artificial Eccles gate, mimicking the ones in our brains. More than just another piece of clever software, more than a mere electronic device, the Eccles gate may well act as humanity's stargate to another dimension, to the presently uncharted realms of transhuman inner space. ▲

Nick Herbert is the author of Quantum Reality: Beyond the New Physics (Doubleday, 1985) and the recently published Faster Than Light: Superluminal Loopholes in Physics (New American Library, 1988).



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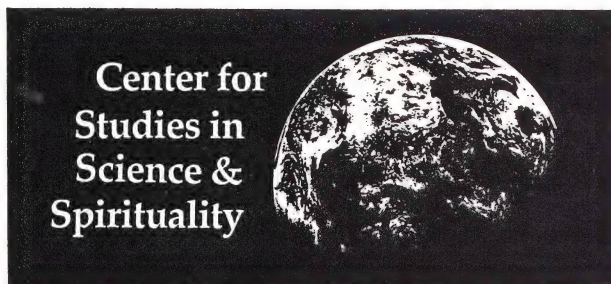
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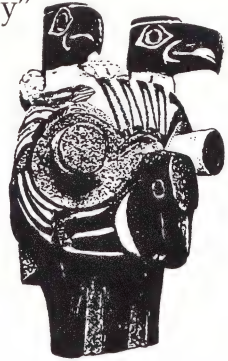
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| July 7 | Donald Rothberg
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| July 21 | Ralph Metzner, "Earth & the Sacred Science of Astrology" |
| July 28 | Lee Hixon
"The Path of the Heart" |
| Aug 4 | Gay Luce, "The Tibetan Mystery of Death" |



Weekend Workshops

(partial listing)

- | | |
|------------|--|
| July 15-16 | "The Sacred Warrior as Spiritual Activist"
Choosh Auh-Ho-Oh |
| July 21-23 | "Mask and Psyche"
Barbara Muhlhauser |
| July 28-29 | "Middle-Eastern Drums in Hand and Heart"
Mary Ellen Donald |
| July 28-29 | "The Heart of the Koran"
Lee Hixson |
| Aug 11-12 | "Maya Cosmology"
Michael Guillen |

California Institute of Integral Studies

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CYBER- EVOLUTION: MONTAGE

by Robert Anton Wilson

Why is the *New York Times* like *Finnegan's Wake*? Perhaps the most important idea Marshall McLuhan ever uttered is in the opening chapter of his very early work, *The Mechanical Bride*. McLuhan simply reproduces the first page of a typical edition of a typical (non-tabloid) modern newspaper — a collage of our global village — and then shows what this Everyday Pop Art has in common with such avant garde works as Pound's *Cantos*, Cubist painting, and *Finnegan's Wake*. He uses words like "non-continuity" and metaphors from quantum mechanics, but basically he is talking about the impact of film on modern sensibility.

We have grown accustomed to thinking/perceiving in holistic montage, and not just in Aristotelian linear sequences like our ancestors. The first page of a newspaper uses the same Cubist juxtapositions as Pound's *Cantos* — or the last half hour of Griffith's classic *Intolerance*, or the first 70 seconds of the equally classic *Prisoner* series on TV. We hardly regard this nonlinear communication as "modernistic" any more, and wonder why critics went ape when Pound and Joyce first employed it. We quickly make sense out of bits of information rapidly delivered.

WE WERE PRIMED FOR THE PC BEFORE IT EVER ARRIVED.

Warning: Social evolution proceeds synergetically/holistically, and the pace of change is accelerating. Nobody can make a more-than-tentative Gestalt out of what is happening. We can only offer temporary reality-tunnels, good until new signals arrive notifying us that we need to make a bigger reality-tunnel *very quickly*.

As Marvin Minsky of M.I.T. says, "Anything you hear about computers or AI should be ignored because we're in the Dark Ages. We're in the thousand years between no technology and all technology. You can read what your contemporaries think, but you should remember that they are ignorant savages." (Quoted in Stewart Brand's *Media Lab*.)

AIDS AND FREEMASONRY . . . Birmingham, Alabama is the home of a group called Christians Awake. Among their educational publications is a pamphlet called *The Washington Monument and AIDS*, which proves that Washington and his fellow Freemasons are ultimately responsible for the AIDS epidemic. The "proof" consists of items like this: the Washington monument is a phallic symbol and was constructed in 1833 to commemorate the 33 degrees of Freemasonry; Freemasonry is a "sodomite cult;" Gay Pride is a Freemasonic conspiracy, et cetera, et cetera.

The "ignorant savages" who wrote this were trying their damndest, within the limits of their reality-tunnel, to make sense out of our increasingly baffling and complex world. If you want to read more of their ingenious explanations, write them at: *PO Box 110013, West End Station, Birmingham, AL 35211*.



1954: BARD COLLEGE, ANNANDALE-ON-THE-HUDSON, NY . . . It was the first time I ever heard Buckminster Fuller speak. He said that by the late 1980's we would all be living in a "one-town world."

In 1988, I have been ostensibly "living" in Los Angeles, but in these twelve months I have visited or re-visited: Maui, San Jose (2x), Berkeley, San Diego, Vancouver, Seattle (3x), Phoenix, Boulder, Dallas (2x), Chicago, Detroit, Cleveland (3x), Philadelphia, Wilmington, New York (2x), Boston, Dublin, Berlin, Hamburg, Heidelberg, Frankfurt, Munich, Bern and Vienna.

I don't suppose this travel log will impress many readers of *Mondo 2000*. Still, re-living 1954 in memory, I am astounded at the mutation that has occurred. Though many people still use the word "jet-setter" to mean some kind of millionaire, most of the folks who are hopping about the globe are not rich at all. They have simply redefined travel.

Throughout evolution, the average mammal has never traveled more than ten miles from the place it is born. Throughout human history, the average person has never traveled more than ten miles from the place she or he was born.

In a one-town world everybody shares the local gossip. The TV generation knows as much about the Arab-Israeli wars and the rumble in Northern Ireland as they do about the quarrels of the family down the block. Often they know more about the Gaza Strip or Belfast's Fall Road than they know about the family down the block.

VECTORS . . . Since 1900 the speed of travel has increased by a factor of 102, known energy resources by 103, explosive power of weaponry by 106, and speed of communication by 107. (Source: J.R. Platt, Michigan State University.)

Americans have also eaten 1.8×10^{10} McDonald's hamburgers.

Average lifespan in Europe was 30 years before the French Revolution. In England in the 1850's it was 37 years for the working classes, according to Engels. In 1900, it reached 50 years for all classes in the Western industrial complex. Now it is 73 and rising, while more money is being spent on life extension research than ever before.

The two most popular TV shows in Ireland are *Dallas* and *Hill Street Blues*. The Irish probably think America consists largely of greedy millionaires, sociopathic nonwhite criminals and harassed cops who are slowly breaking down mentally in the effort to keep a lid on the chaos.

Just how inaccurate is that picture?

MEME EXPLOSION . . . Just as biological heredity is carried by genes, the English biologist Dawkins suggests that we regard "culture" as the product of information units he calls memes. We are living through the most dramatic meme explosion in all history.

According to *The Mathematical Experience* by Davis and Hersh, the last human to know all mathematics was Alexander Ostrowski, who died in 1915. In the late 1940's, John von Neumann estimated that the best-informed mathematicians knew only about ten per cent of the then-published theorems. In the 1960's, Stanley Ulam estimated that 200,000 new theorems were being published every year. Davis and Hersh concluded that at the time they wrote (c. 1980) no mathematician could learn more than one per cent of the math that had been published.

PISS WARS . . . George Bush volunteered to be one of the first Americans to take a urine test for drugs. During the Iran-Contra investigations, however, Bush refused to take a lie detector test. As Paul Krassner astutely commented, it appears Bush doesn't want us to know whether he's telling the truth or lying, but he wants us to be sure he's not stoned while doing it.

NEITHER KAFKA NOR ORWELL, IN THEIR WILDEST SATIRES ON TOTALITARIANISM, IMAGINED A GOVERNMENT PRYING INTO THE BLADDERS OF ITS CITIZENS FOR EVIDENCE OF MINDCRIME.

Neurologically, *Piss Wars* opens awesome possibilities. The most widely used urine test in the country detects traces of marijuana and cocaine but does not detect LSD. The corporate structure of the short-term future will therefore thin out the ranks of pot smokers and coke freaks while the acid heads climb merrily upward in the hierarchy. This would suggest that the sensuality of grass and the wired aggression of coke will dwindle in Power Centers but the morphogenetic/futuristic evolutionary visions of LSD will play an ever-larger role in shaping policy.

Think about it.

***Bush doesn't want us to know
whether he's telling the truth or lying,
but he wants us to be sure
he's not stoned while doing it.***

ONE TON A DAY? . . . On the other hand, a friend in Silicon Gulch recently told me there is a ton of grass smoked every day in that area — where most of the **software of Star Wars** is being produced. I couldn't believe it at first, but he worked it out on his computer and showed me. The population is 4 million. Assuming only half of them smoke grass and they smoke only one joint a day — reasonably conservative estimates, I think — one comes out with a ton of weed, and a heavy fog of cannabis vapor circulating "in the belly of the beast" (as SDS used to say).

Most of the companies in the Gulch are unwilling to institute *Piss Wars*. They know if they did, they'd lose

their most talented, diligent and inspired software experts immediately.

The modern "barbarians" — the Cyberpunks — are not only within the gates, but have penetrated the Citadel itself.

HOLY WARS . . . A-Albionic Research (626 Flowerdale, Ferndale, MI 48220) is a publisher of books and pamphlets dedicated to demonstrating the proposition that "The British Empire is the Central Phenomenon of World History Since the Decline of the Vatican" (their caps). None of their literature is as wacky as that stuff from Christians Awake about the Washington Monument and AIDS and there are only occasional clearcut lapses into "twisting the facts to suit the theory." They simply argue, with massive documentation, that the U.S. and U.S.S.R. only *seem* to be major powers and that, in actuality, the Brits are still running everything from behind the scenes.

A multitude of conspiracies contend in the night. The cyberpunks are the wild cards and in them we must place whatever hope we can muster.

CHICAGO 1971 . . . Weather Underground were still at large. A tiny, fanatic *but not stupid* portion of the Youth Revolution of the 1960's had abandoned Flower Power and were copying the I.R.A. and the P.L.O. Others, less desperate, were playing games with government computers, especially Selective Service computers. Whole archives were being erased with magnets, remember?

A friend told me a strange story one day in 1971. Several months earlier, all his debts had disappeared. The monthly reminders from the banks simply stopped arriving in the mail. He played it cool, stopped paying and waited. Nothing ever happened: the banks never found him again.

Three theories: One, it was simply a fuck-up. Just an example of the "S.H. Law," known to everybody who uses computers: Shit Happens. Two, some charitable programmer who knew my friend simply erased all his debts. Three, somebody erased a hell of a lot of debts, and I just met *one* of an unknown number of beneficiaries of this early stage of the Cyberevolution.

I wrote this up later, fictionalizing it, in the first cyberpunk novel, *Schrodinger's Cat*. In my novelized version, the beneficiaries not only have their debts erased but get a card in the mail saying

CONGRATULATIONS!

YOU ARE ONE OF THE LUCKY 500 WHOSE DEBTS HAVE BEEN CANCELLED BY THE NETWORK. KEEP YOUR MOUTH SHUT AND PLAY IT COOL.

Of course, in my novel, the "lucky 500" turn out to be millions. The Network, the earliest cyberpunk group in

fiction, just did not want the straight citizens to realize they were being seduced into the first nonviolent anarchist revolution.

Of course, this has not happened in the real world. Of course. Or if it has, I haven't heard about it. But I can't be the only one to have thought of this.

JUST FLY LOW . . . The biggest banking scandal of the past decade was the collapse of the World Finance Corporation in Miami, when its officers were indicted by the Dade County District Attorney for knowingly engaging in laundering cocaine money for various Latin American governments. According to both Penny Lernoux' *In Banks We Trust* and Jonathan Kwitney's *Endless Enemies*, eight of the executives of the World Finance Corporation had direct links with the CIA, and the District Attorney himself called a press conference to declare, with his bare face hanging out, that the CIA was deliberately blocking his investigation. Nevertheless, the president of the W.F.C. and several other officials were indicted and convicted, and evidence was uncovered that the CIA had been using the bank to transfer money for "deep cover" covert operations in Latin America.

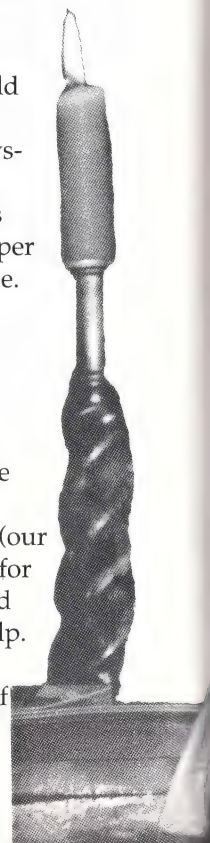
Only those dumb enough to vote for George Bush will believe that the CIA was using the bank for covert operations without knowing it was also a cocaine laundromat.

The President of the W.F.C. was Guillermo Cataya, veteran of the CIA's "Bay of Pigs" team. The money laundering chain begun by the W.F.C. moved the funds to the Cisalpine Bank in the Bahamas, owned by Archbishop Paul Marcinkus, manager of the Vatican Bank, and Roberto Calvi, President of Banco Ambrosiano, found hanging from a bridge in London on June 18, 1982.

DEFORESTATION . . . According to *Popular Mechanics*, February 1938, a new invention would soon make it possible to end the cutting of trees to produce paper for our books, offices and newspapers. *Popular Mechanics* was so enthusiastic about this invention that they predicted farmers would earn billions of dollars a year making paper this way and would never cut down another tree.

As you look around at our devastated forest lands, you might ask yourself what the hell happened in the past 50 years. Where did the wonderful invention go?

Well, kiddies, the wonderful invention was a device that made it possible to *harvest hemp* more cheaply than ever before. Hemp was the chief ingredient in paper throughout most of history (our Declaration of Independence was written on it, for instance) and paper made of hemp lasted a good long time compared to paper made of wood pulp. Ever notice how 19th or 18th century books or even 17th century books like the original folio of Shakespeare's plays, printed on hemp, are still



around, while modern books printed on wood pulp fall apart in only decades?

Our books continue to rot away quickly, and our forests continue to be destroyed because the U.S. Government declared war on hemp. They had found out that some people smoke it and get happy.

Puritanism, to quote H.L. Mencken, is "the haunting fear that somebody, somewhere, might be having a good time."

MYSTERIES OF MASONRY . . . When Roberto Calvi was found hanging from that bridge in London he was wanted in Italy for stock and currency fraud in connection with his Banco Ambrosiano. Curiously, the day Calvi died, his secretary was defenestrated — fell, jumped, or was pushed — from a window of the Banco in Milan. Even more curiously, Calvi was found with bricks stuffed in his pockets and was hanging where the rising tide had covered his dead body.

Bricks are symbols of Freemasonry, and being hanged where the rising tide will cover one's body is the punishment threatened, in the first degree oath, to any Freemason who betrays his fellow Freemasons. It seems likely, then, that Calvi was killed by fellow Freemasons, or by persons who ardently wish us to think he was killed by fellow Freemasons. Mrs. Calvi had persistently charged that "men high in the Vatican" ordered her husband's assassination.

In the 32nd degree of Masonry, it is explained to the candidate that the function of the Free and Accepted Craft of Freemasonry is to subvert and frustrate the efforts of the Knights of Malta who are described as agents of "tyranny and superstition."

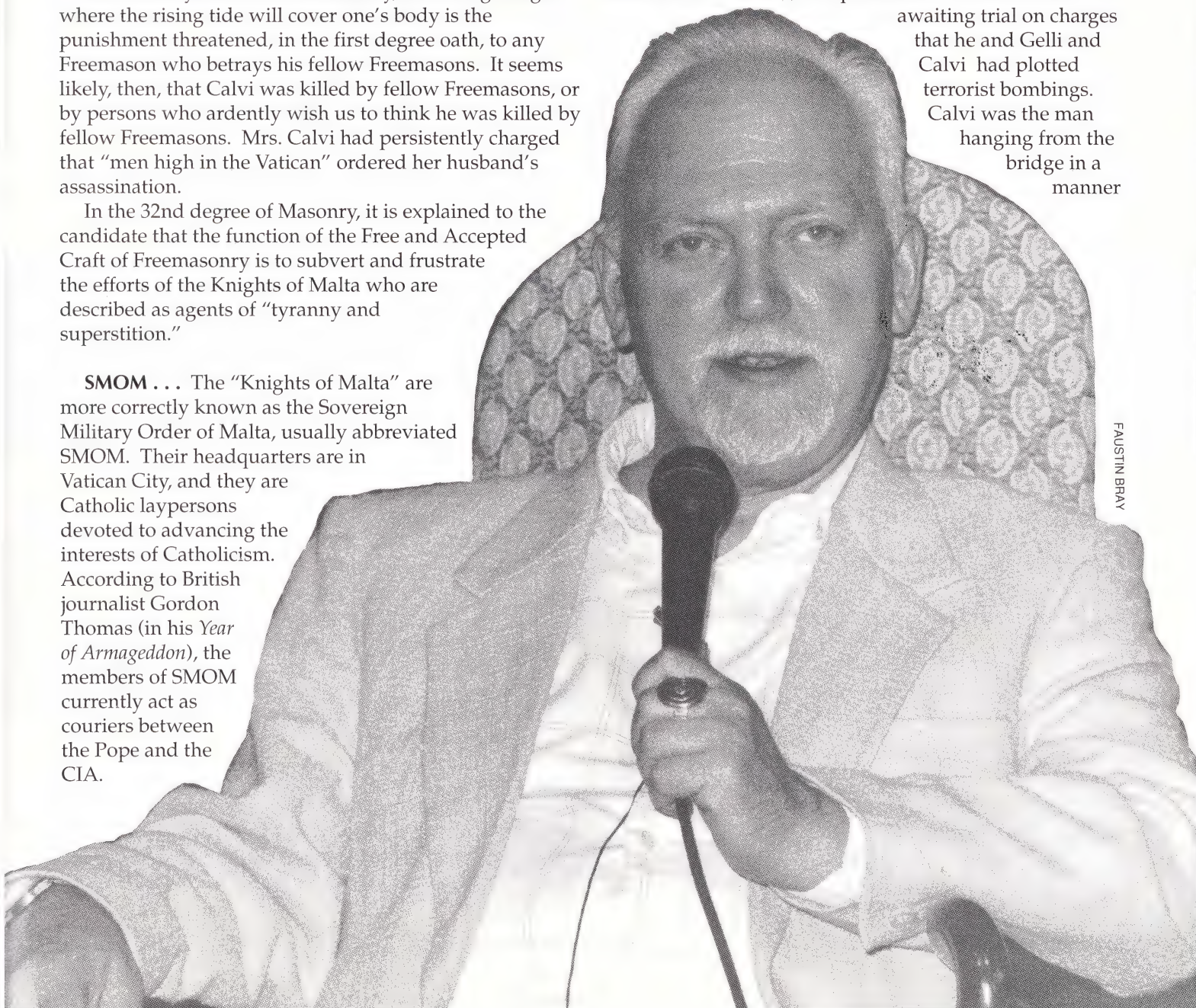
SMOM . . . The "Knights of Malta" are more correctly known as the Sovereign Military Order of Malta, usually abbreviated SMOM. Their headquarters are in Vatican City, and they are Catholic laypersons devoted to advancing the interests of Catholicism. According to British journalist Gordon Thomas (in his *Year of Armageddon*), the members of SMOM currently act as couriers between the Pope and the CIA.

Prominent members of SMOM have recently included Franz von Papen, who persuaded von Hindenberg to make Hitler Chancellor of Germany; Otto von Hapsburg, President of the League for the United States of Europe and a prominent Bilderberger; William Casey, former director of the CIA; General Alexander Haig; General Reinhardt Gehlen (chief of intelligence for Hitler and, later, chief of the Russian "covert penetration" operations for the CIA); Alexandre de Marenches, former chief of French Intelligence; and William F. Buckley Jr.

In Italy the most prominent Knights of Malta recently have been Licio Gelli, head of the P2 Conspiracy, who has been charged with setting up the cocaine laundering business for Calvi and Archbishop Marcinkus, organizing terrorist bombings and plotting a fascist *coup*; and Michele Sindona who was president of the Franklin National Bank, convicted of 65 counts of stock and currency fraud in New York, extradited to Italy and convicted of murdering a bank examiner there, and poisoned in his cell while

awaiting trial on charges that he and Gelli and Calvi had plotted terrorist bombings.

Calvi was the man hanging from the bridge in a manner



FAUSTIN BRAY

calculated to cast suspicion on Freemasons. (Source: *Covert Action Information Bulletin* #25.)

Sindona was a guest at Nixon's second inauguration. Gelli was a guest at Reagan's first inauguration. Funny coincidence, that.

Maybe A-Albionics is on the right track. Maybe the Brits have taken over and P2 is a Vatican attempt to regain what they have lost in the past five centuries.

Maybe.

On the other hand, according to both David Yallop's *In God's Name* and Penny Lernoux' *In Banks We Trust*, Licio Gelli, who organized the Vatican-cocaine loop, was employed by the CIA from the mid-1950's on.

PENN SQUARE . . . In Gelli's P2 Conspiracy, banks were being used to launder drug money and finance right-wing Catholic dictatorships. In the Penn Square case, we find something curiously different.

Penn Square Bank of Oklahoma went belly-up after granting a mysterious series of unsecured loans to various individuals and corporations. The matter eventually cost shrewd old Chase Manhattan a pretty penny — forty-six million dollars, according to Lernoux' *In Banks We Trust* — because Chase had, for unknown reasons, guaranteed Penn's unsecured loans.

The Vice President in charge of loans at Penn Square, William G. Patterson, was in the habit of wearing Mickey Mouse ears in the office. They were the kind that wiggle when the wearer pulls a hidden string inside his jacket, and Patterson liked to wiggle them while discussing loans, a sight which must surely have disconcerted some customers. Patterson also once attended a meeting of the Seattle First National Bank dressed as an Arab sheik, which raised eyebrows.

Lernoux concluded that the drug trail involves banks all over the world. I conclude that some of the bankers have been sampling the merchandise.

NEUROMANCER BREAKS THE ICE . . . In August, 1986, scientists at Lawrence Berkeley Laboratory discovered that an intruder had invaded their computer system. It took a year and a half of hard work before they tracked this neuromancer back to his physical coördinates in space-time, a house in Hanover, West Germany. The German authorities declined to prosecute because of "lack of evidence."

In the course of the investigation, LBL discovered that the neuromancer had also gained access to various military computer systems in the U.S., Air Force bases in Germany, Boston University, the Pasadena Research Laboratory, to Fort Bruckner (an Army base in Japan) and even to the Navy Data Center in Norfolk and the Livermore National Laboratory.

Clifford Stoll of LBL has written a paper about it. It's called "Stalking the Wily Hacker," and is in *Communications of the Association of Computing Machinery*, Vol. 31 No. 3 (May 1988).

Curiously, my attention was not called to this by any of my friends up in Berkeley or Silicon Gulch. A xerox of Stoll's paper was handed to me in Hamburg by a guy who came to hear me lecture on James Joyce. He said, simply, "This will amuse you."

YANKEES AND COWBOYS . . . Prof. Carl Oglesby, in *The Yankee and Cowboy War*, offers a model which attempts to explain clandestine activity in modern American politics using the Kennedy Assassination and Watergate as two case histories for close analysis. According to Oglesby, we haven't got one Power Elite, as C. Wright Mills thought; we have two. The Yankee Elite is made up of old New England/New York banking families who are accustomed to running this country and have considerable skill at doing the job subtly and unobtrusively, behind the mask of democracy. The Cowboy Elite are a loose and often feuding association of new Western interests (oil, computers, aerospace) who resent Yankee control and are continually plotting to take over more of the Power Structure.

In *Right Where You Are Sitting Now*, I offer an extension of the Oglesby model, tracing East-West conflicts and conspiracies throughout history. I suggest that new ideas and new capital — capital being ideas that work: technologies — have steadily moved Westward throughout history and have always given the Western Power Structure the opportunity to topple the previous Eastern Power Structure.

The future will probably regard Oglesby and me as "ignorant savages," too. And I have somewhat oversimplified his thesis. His view is actually: "A multitude of conspiracies contend in the night . . . Conspiracy is the normal continuation of normal politics by normal means . . . Where there is no limit to power, there is no limit to conspiracy."

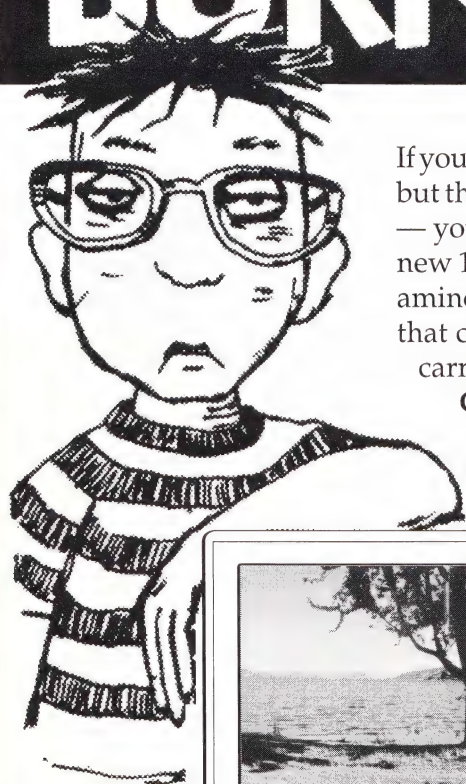
MARILYN . . . According to Anthony Summers' *Goddess*, Bobby Kennedy ended his affair with Marilyn Monroe because he learned that Mafia leader Sam Giancana had hired detectives to plant a bug in the bedroom at Peter Lawford's beach house (where Bobby and Marilyn met to exchange the delights of sweet love). Bobby learned about this from a wire-tap he had on Giancana.

Imagine that. While the Justice Department wire-taps the Mafia, the Mafia is wire-tapping the head of the Justice Department, and he finds this out from his tap on them before they find out he has a tap on them. We are living in a LeCarré novel!

Nobody can make a more-than-tentative Gestalt out of what is happening. We can only offer temporary reality-tunnels, good until new signals arrive.

A multitude of conspiracies contend in the night. The cyberpunks are the wild cards and in them we must place whatever hope we can muster. ▲

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input

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input

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The Roots of Personal Computing

by David Bunnell

People are always amazed when I tell them it all began in Albuquerque, New Mexico. Not Silicon Valley, not Route 128. That's right, personal computing was born in the Land of Enchantment, the land of turquoise jewelry, and blue-corn enchiladas with an egg on top. I know because I was an eyewitness. I was in the actual god-damn delivery room. As head MITS propagandist — and on a nearly nonexistent ad budget — it was my job to get the word out about this revolution to hobbyists throughout the land. It was also my job to write instructions telling them how to put these things together, as the majority were sold in kit form.

The other day I was in Stacey's bookstore in Palo Alto where I saw something that had me laughing uncontrollably and nearly rolling in the aisles. It was the *Microsoft MS-DOS Encyclopedia* — or more precisely it was a photograph in the introduction of this 3000 plus page tome. There was the world's youngest self-made billionaire, Bill Gates, his rockin' roll partner Paul Allen, and the original Microsoft crew as they appeared in 1977 when they were in start up mode in Albuquerque.

Yes, Microsoft started in Albuquerque, too. As did *Personal Computing* magazine and the now defunct U.S. Robotics Society.

Bill wasn't so rich then, though Microsoft was already the number one microcomputer software company. The funny part is that Bill and the gang looked so outrageously scruffy and young and very unlike a future Fortune 500 company. Long hair, beards, sloppy casual dress — these people look like they were just coming down off a ten-year acid trip.

Acid rock. When Gates and Allen started the MITS software division in 1975 prior to striking out on their own, they played the loudest, hardest driving music they could find and they played it full blast all day long while sitting at their keyboards writing code.

MITS — where personal computing began — was as funky as its crew. It was located in a rundown suburban shopping center between a massage parlor and a laundromat. The president of the company — Ed Roberts — who is by all rights the father of the whole friggin' industry, was probably the only semi-conservative person in the whole place. Everyone else was a misfit of one stripe or another. Ed was a former Air Force engineer stationed at nearby

Kirkland Airfield who got tired of working on TV camera-controlled bombs. He started MITS as a hobby — though soon it was the Air Force that was a hobby.

There wasn't one professional computer scientist within a hundred miles of MITS and if there were we probably would have had him or her assassinated. At MITS we hated the "Computer Priesthood." Our mission, from Ed Roberts on down, was to liberate technology. We were going to make computing available to millions of people and do it so fast that the U.S. Stupid Government couldn't stop it.

You might laugh but there was actually talk in Congress of requiring people to have a license before they could program a computer. We figured that we had to have several hundred machines in people's hands before this dangerous idea emerged from committee. Otherwise, 1984 would really have been 1984.

The personal computer was just as important to New Age people as the six-shooter was to the original pioneers. It was our equalizer. A tool to fight back with. The PC gave the little guy a fighting chance when it came to starting a business, organizing a revolution, or just feeling powerful.

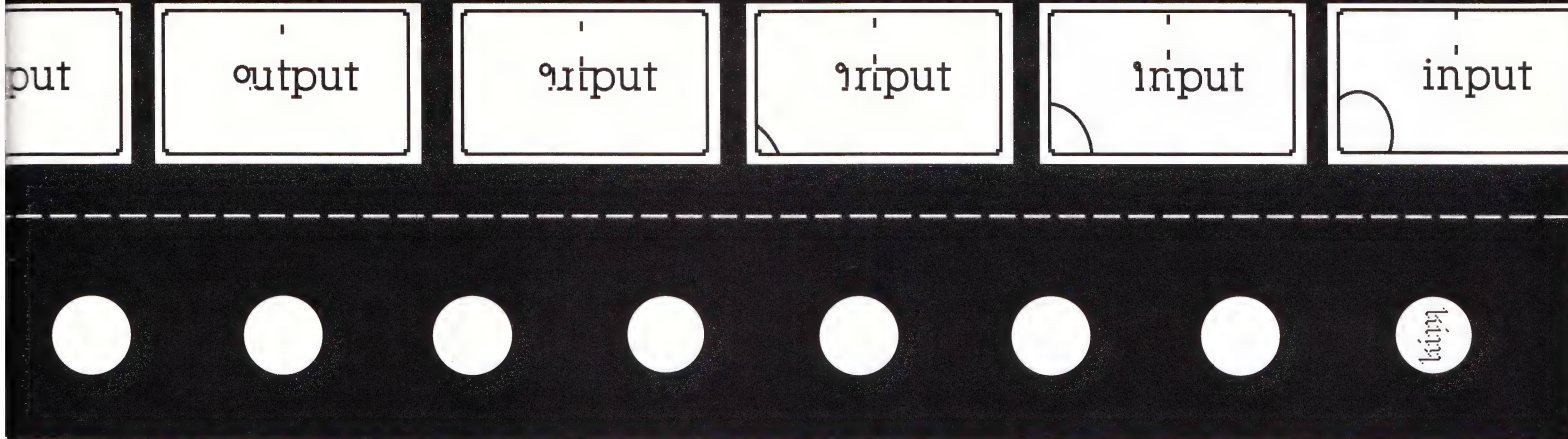
There was a burning desire, a mass collective dream held by thousands of hobbyists — they hoped the day would come when they could have their very own computers.

The first personal computer — named Altair after one of the brightest stars — was featured on the January, 1975 cover of *Popular Electronics* magazine. The day the issue came out MITS was a company of 12 people and Bill Gates was a student at Harvard. From that moment on the world was changed forever.

We first noticed something was different when the phones just wouldn't stop ringing — even far into the night. Mail started arriving in dozens of mail bags. People were actually camping in the parking lot waiting for delivery of their Altairs. Our manufacturing staff was all of 3 people. We were nearly buried alive.

Paul Allen and Bill Gates were two of these rabid hobbyists. When Allen spied *Pop Tronics* on the newsstand, he grabbed it and ran across Harvard Square to find Gates. "Bill" he shouted, "it's already started and we're going to be left out!"

Fortunately, most of those hobbyists who lusted after a computer of their own were foolish enough to pay us with cash in advance. MITS was flooded by checks. We expanded rapidly and within a few months we were in



spacious new quarters out by the Albuquerque International Airport.

Gates and Allen hurriedly created a BASIC language compiler for the Altair. They called Ed Roberts and asked him if he was interested and he said, "Sure, as long as you can show me it works."

As Allen's plane neared Albuquerque he suddenly realized that he needed to write a loader program in the Altair's machine language in order to load BASIC into the computer from paper tape. He literally finished this work as his plane landed on the runway.

The amazing thing is that it worked. Gates dropped out of Harvard and the rest is history.

In March, 1976, we held the first World Altair Computer Convention at the Airport Marina hotel — an event which attracted computer hobbyists from every state in the union and from several other countries, not to mention planets. Luminaries like Ted Nelson, David Ahl, Carl Helmers, Wayne Green and Les Solomon. We knew then that we were a collective body, a movement that couldn't be stopped.

The essential, undeniable trait of the computer hobbyists who gathered at the World Altair Conference is that they were all rebels — rebels with a vision of making computers available to ordinary people on a worldwide basis. In their ranks were the pioneers who started the first computer retail stores, the first personal computer magazines, the first personal computer hardware and software companies. Very few of them had any business sense. Most couldn't even balance their own checkbooks.

We talked late into the night. Ted Nelson, forever the visionary, punctured our balloons when he observed that the hobbyist days of personal computing would be short lived. "Soon," he predicted, "personal computing will become just another business."

Oh shit, I say, Ted was right. Personal computing has become just another business. Bill Gates wears a jacket and tie. Apple Computer is the darling of Wall Street and hardly anyone remembers MITS at all.

However, something incredibly important transpired along the way: computer technology was liberated. It is presently in the hands of millions worldwide. The participants who created the industry may have turned into business toads, but users, God bless their nerdy hearts, are carrying on the vision.

In the 14 years since Altair, over 12 million personal computers have been unleashed upon the planet and thousands more are pumped out of the factories on a daily basis. Even the Soviet Union has gotten hip to this new technology and, amazingly enough, they have an avid interest in desktop publishing and online communications.

It is now up to the people who care about advancing humanity and improving the quality of life to make full use of this new power. Like a Trojan horse, the PC has arrived. The CyberNet is in place and the future is ours. ▲



David in Russia

MARSHALL MCLUHAN

the cognitive agent as

CYBERPUNK GODFATHER

by Terence McKenna

The Letters of Marshall McLuhan

edited by Mattie Molinaro, Corinne McLuhan and William Toy,
Oxford University Press, New York, 1987, 562 pp., \$30.00 cloth

Few careers have been as meteoric or as misunderstood as that of Marshall McLuhan. In the mid 60's, McLuhan's pronouncements appeared to exemplify the new thinking behind the social upheavals of the times: civil rights, the war in Viet Nam and the psychedelicizing of young America. I well recall what a polarizing force McLuhan was. To the old style thinkers, to those we called "straight," McLuhan was flippant, wigged-out, and incomprehensible. While to those of us who considered ourselves hip, McLuhan was as transparent as water. He seemed to be giving permission; permission for youth culture, rock and roll, and post-print libidinal tactility to finally, mercifully dismantle linear stuffed-shirt Western Civilization. All as part of the larger agenda of global tribalism and fucking in the streets.

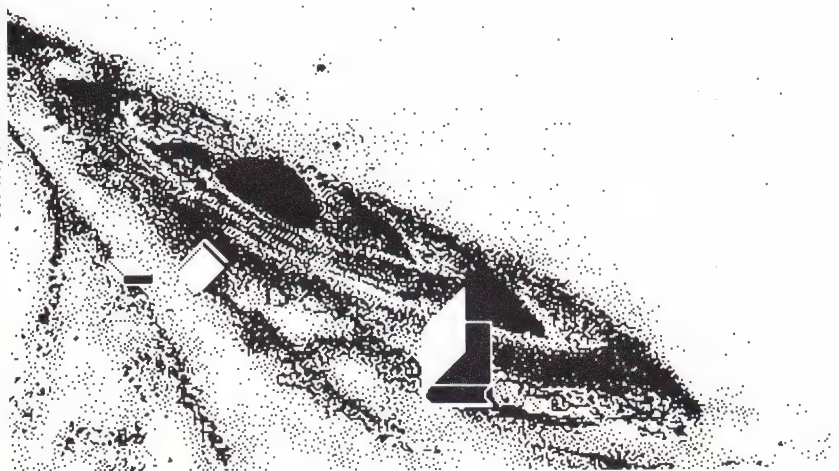
Fucking in the streets was, of course, the ultimate symbol of the end of privacy and rule by gentlemen. How we debated McLuhan's role in all this! Certain that he must be one of us, we searched his writing and television appearances for the tell-tale clue, the sly tip-off, that he too had passed the Acid Test. McLuhan's influence barely outlasted the social phenomena that he probed and

illuminated. A different wind blew through the 70's, and while McLuhan died on the last day of that decade, the apogee of his influence had been some dozen years earlier. Having never really been understood by even his most vociferous defenders, his name is now dated and his work has receded into the obscurity of other-era philosophies. Like his idols Thomas Nashe and James Joyce, his legacy remains to delight the leisured, learned few.

The letters give us a slow fugue of intellectual unfolding; thousands of them, written over forty-eight years. The early years express a boundless enthusiasm for English literature and awareness of little else. The McLuhan we meet in the published works is a distillation of the visionary outrageous McLuhan. The letters reveal another McLuhan, in many ways extraordinary in his ordinariness. He has all the gung ho zeal of a Catholic convert (in December, 1936). Added to his native Anglo-Canadian caution, this makes him an unlikely candidate to lead an intellectual slave revolt. His conservatism takes many forms, e.g. his almost fawning admiration for the proto-Fascist founder of Vorticism, Wyndham Lewis. Or the letter to Pierre Elliot Trudeau in 1975 in which he defends capital punishment: "I seem to be saying that the ritual of capital punishment, carried out in the most public possible way, is itself an intensively creative outlet for the entire society."

McLuhan's urge to play prophet painted him into some bizarre corners. He ardently believed that the introduction of color television in the late 60's would lead to a general race war in all high tech societies in "two or three years." In 1964, as McLuhan was beginning to come into the public eye, we find him involved with questions of "the influence of Freemasonry and Rosicrucianism on the arts." He is a convert to conspiracy theories of history, yet manages to dismiss William Burroughs. "He is not a very bright person. He is reacting rather than acting." Of course, letters to Ezra Pound, Hubert Humphrey and Tom Wolfe can hardly fail to be interesting. And listen

Courtesy of SPIRALING BOOKS



to McLuhan lecturing Prince Bernard of the Netherlands: "As my friend Wyndham Lewis, the painter, put it, 'The artist is the only person who lives in the present.' Without a knowledge of all the poets and painters, and artists from Baudelaire to Joyce, it is futile to attempt any appraisal of the formal or efficient causes initiated by the evolutionary extension of our bodies which we call technology."

Much to his credit, McLuhan did have an instinct for the vital nerve of Western cultural pretensions. In 1972 he wrote to Edmund Carpenter: "The Western psyche is a fragile, specialized product of the phonetic alphabet which stands in terror of any snooping around for its credentials, whereas tribal men welcome such study. The tribal man says, 'Let's see what will happen and then decide to stay away from it,' whereas Western man says, 'Let's try it anyway and see what happens.'" Or again: "The suddenness of the leap from hardware to software cannot but produce a period of anarchy and collapse in existing establishments, especially in the developed countries. That is our immediate prospect and our present actuality."

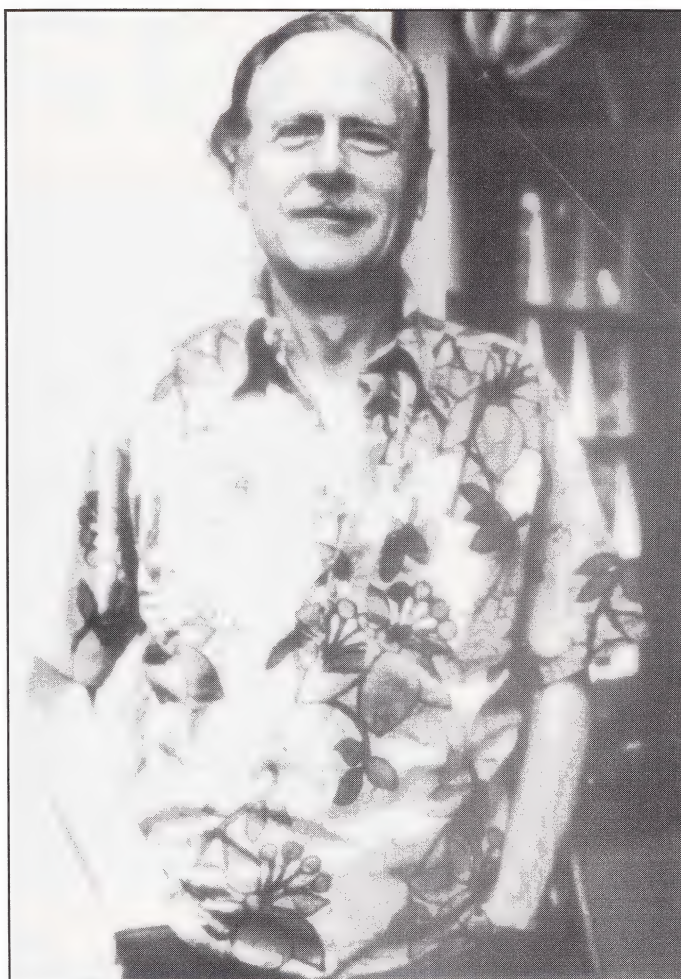
To Rollo May, McLuhan offers a summation of his notions along this line: "The private identity of Western man appears to be grounded in the peculiar effects of the phonetic alphabet in abstracting private from corporate identity. If private identity, in this sense, is an artifact, then it is easier to understand why any probing of the nature of psychic change, as shaped by our outer environments, might breed insecurity and panic."

McLuhan seemed to be giving permission for youth culture, rock & roll, and post-print libidinal tactility to finally, mercifully dismantle linear stuffed-shirt Western Civilization.

In the wake of the new bill passed by Canada's House (Bill C-264), it is instructive to turn to McLuhan's remarks about drugs in a letter to Prime Minister Trudeau:

"Drugs. The clue is in prohibition of the 20's. Booze is not new. It was the panic that was new. So with drugs today. It is the panic that is new. The new radio environment of the 20's created a new primitivism and tribalism which we associate with the jazz age. Tribal people cannot abide booze. It sends them berserk. They are already excessively involved in each other without stimulants. The WASP, on the other hand, needs gallons of booze in order to be sociable. In the 20's, the WASP had gone tribal and booze began to terrify him.

The key to the drug panic is TV. TV intensifies the already numerous forms of inner-tripping. Color TV is psychedelic input. The kids are simply putting jam on jam when they take to drugs. They seem to imagine that it helps them relate to an electric speed world, whereas they are quite unable to relate to the fractured and



BARBARA WILDE

fragmented specialities of a pre-electric school and goal and job system.

In the 20's, booze created a huge police state as we tried to prop up the old form of social arrangements. Drugs likewise provide a field-day for the Mafia as we try to maintain the patterns of the pre-electric age while the kids are miming electric speeds and the externalization of their nervous systems created by electric circuitry."

March 2, 1972

Prescient words. Seen in the context of his time, McLuhan's legacy is all the more remarkable. *The Letters* contextualize his work so that what now seems commonplace strikes us again with apocalyptic force. He accurately nailed the attraction of psychedelic drugs. Yet he believed that the notion that they could augment intelligence and cognitive flexibility was delusory. On the other hand, Leary reports a personal conversation with McLuhan in *Flashbacks*. "Drugs that accelerate the brain won't be accepted until the population is geared to computers," he is said to have told Leary. He even coached Leary in marketing psychology and smilesmanship. Juxtapositions of this sort underscore the central paradox of Marshall McLuhan — the man some hail as the Godfather of Cyberpunk. ▲

Some Good Things to Say About Computer Viruses

by Allan Lundell

Recently, I was hanging out at Hacker Haven, a top secret location in the Santa Cruz Mountains where hackers come to gather their strength. With me were Ed Zackley, Bill Me Tuesday, and Dr. Expansion. The subject turned, inevitably, to viruses. As we opened the conversation, Bill Me Tuesday was dilating on the One Time Pad Key System, a crypto-code presently used by the U.S. Government.

Allan Lundell

ONE TIME

BILL ME TUESDAY: It's used for all embassy communications — communications to launch the missiles — wherever the utmost security is required. It is absolutely unbreakable, assuming your key is really random. The concept of the exclusive OR gate is the basis of any crypto system. What makes it a one time pad is that you use the key once and throw it away. No one has a chance. If you use it over and over, then patterns start to emerge.

The DES crypto code, developed by the NSA, was finally cracked by hackers. They used DES for the Videocipher system for TV satellites, scrambling HBO and Showtime. Hackers bastardized DES by playing repetitive information over it, which allowed the hackers to figure out the pattern. And that was it! Videocipher 1 and 2 are now completely broken. No one has to pay for satellite access to HBO or Showtime anymore. No one should have to pay for them except for the cable companies, and they don't need the scrambling anyway.

MONDO 2000: Will this make it possible to have completely private, untappable phone conversations?

Absolutely. A personal One Time Pad system would prevent all government monitoring of your communications, and a modification of DES would have them going for years. You could easily design your own unbreakable crypto system for personal phone conversations with the new ISDN digital phones.

VIRAL SERVANTS

M2: Do you think there are any good uses for viruses?

Yes. They can clean up your computer and they can be used as a hacking tool. They provide a good way of investigating closed systems. You can send viruses to all parts of the operating system to look for patterns as it is running. Kind of a logic analyzer, if you like. Viruses can act like a logic analyzer.

M2: Earlier you mentioned a viral telemetry as a good use for viruses. Could you elaborate a little on that idea?

BMT: You'd insert a little piece of code that would tag modules in your program. The little piece of code would be a virus. It would be looking for certain things to happen in those modules and then cause a branch or call when these certain things occurred. It would then let you know what those things were. Like sentries, that pass on to you information about what they are monitoring. It would also call a subroutine that would simulate and interrupt and record what all the status flags were and where the machine is at when something happened.

M2: For personal use, you'd design the viruses to look for common problems that might occur in your software.

BMT: As the virus goes through the operating system, it stops at certain check points, doing its rounds in a given amount of time. This check point will report back what the condition is. Should a condition not be right, it will attempt to correct that situation. It will find the part that went bad, for example, and replace it. Essentially the virus will serve as a means of creating a self-repairing system.

The customer buys an infected system, infected with viruses designed for self-repair. They will also defend against invading viruses. If an alien virus tries to replicate in the system, it will alert one or more of the check points. At that point it will be removed by the system viruses. If viruses are going to attack my program, I'm going to write viruses that attack viruses. The goal is a self-repairing crash-resistant system, similar to the way our bodies repair themselves.

Biologically we are the product of thousands of micro-organisms cooperating together. We can apply that kind of thinking in the computer world. We are modifying the concept of a virus to serve us.

Viruses could also eliminate computer bugs. Bugs often cause a piece of computer code to be stuck in a loop or run wild, tearing up data in the process. So if there is a very small piece of memory that keeps track of everything the computer does (like an aircraft flight recorder), you could backtrack when a piece of code goes crazy. A sentry virus monitoring the situation could take action by snipping out that piece of code run amok and replace it with good code, and then you could put a program in there that would kill them all off when they were no longer needed.

20,000 STRONG

M2: Do hackers consider themselves a counterforce to greed?

BMT: Yes, and it would be reasonable to assume that there are 20,000 hackers out there, and that collectively, they have more power than all the governments.

M2: Through their ability to control the computer systems of the planet.

BMT: Hackers are anarchists. Governments are institutionalized, regimented, bureaucratic systems.

DR. EXPANSION: The fall of cultural structures remind me of a phenomenon in virology called "onco-viruses." When an organism reaches a certain level of deterioration or illness, viruses spontaneously appear in the system and help take it apart. Agents of decay that serve to disassemble the system so that a new order can form. This is one of the many roles hackers seem to play with respect to social institutions such as the government or legal system.

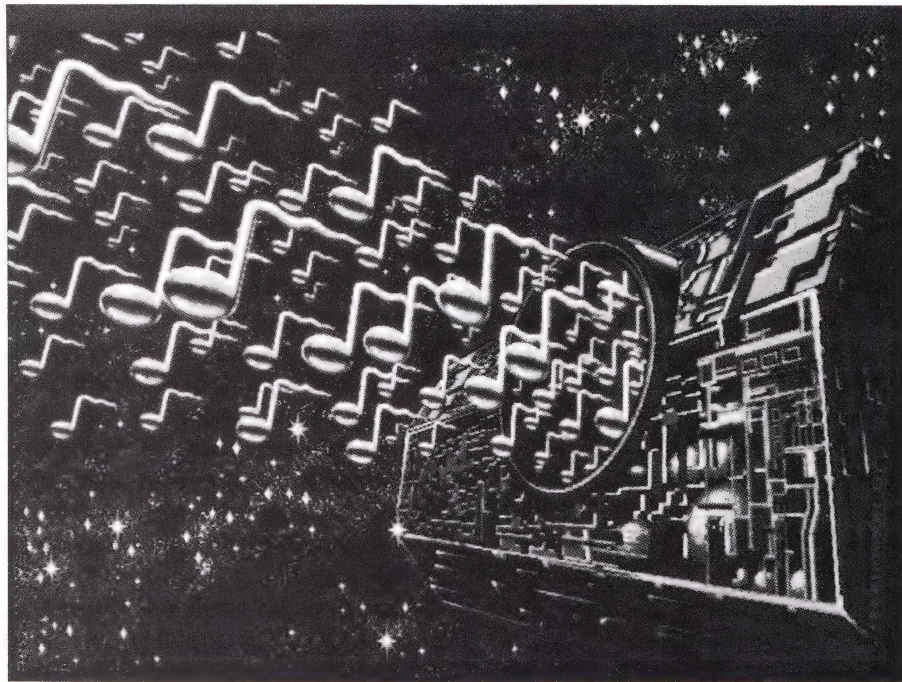
BMT: Death viruses. Oh!! If you think about how governments and societies at large are dependent on computers, hackers have taken over the world.

M2: You say hackers have taken over the world?

BMT: Hackers *have* the world. As things get out of hand, there are several thousand hackers out there who will take action.

Excerpted from Virus! Invaders that Breed and Destroy by Allan Lundell (Contemporary Books, Chicago, 1989). ▲

DNA SUITE



Music of the Double Helix

by Jas. Morgan and Cathy Moe Murphy

What is the sound of the genetic code? It depends on the source of the DNA. Cow DNA has a repeat of 23 bases (R.A. Wilson enthusiasts take note!) and gives a lilting feeling when played. A bacterial clone features a clear melodic riff derived from its simple five base repeat. And a 300 base sequence found in human DNA produces a beautiful melody in a distinctive waltz signature.

In the past few years, molecular biologists have discovered that a major fraction of DNA is composed of repeating sequences. Dr. David Deamer, a molecular cell biologist at UC Davis, and Riley McLaughlin, a synthesist, have developed a system for translating these sequences into music. By assigning musical notes to each of the four bases, they have found that various DNA templates resound with the cosmic boogie of the human biocomputer.

The system allows for some human musical discretion, such as choosing the octave for any given note, and the time, tempo and direction of play along the DNA sequence. If two or more bases are together in the same sequence, the note is held for an equal number of beats. In the case of a gene where information is stored in the form of base triplets, a musical triplet is played.

There's just one rule for a successful composition. A molecular biologist, upon hearing the resulting music (or looking at the score), must be able to instantly decode it into the original DNA sequence.

DNA Suite is a collaboration between Deamer and McLaughlin. *DNA Music* is a solo work by McLaughlin. Both are available on tape for \$11.99 from: *Science and the Arts*, 144 Mayhew Way, Walnut Creek, CA 94596. ▲

DNA SUITE



Here the QUARKS Come



QUARK OF THE DECADE?

by Timothy Leary

On my screen, Bill Gibson is the MVPP (Most Valuable Performing Philosopher) of the decade. *The Hot Author*. He wrote our Book of the Year. Four times and still running!

GIBSON GAVE US GOOD NAMES AND USEFUL CHARACTER-ISTICS

Bill just calmly splashed across our screens with four flashy, sexy, 21st century hearsay-gossip Cyber-Texts that we, up here in Fore-site, had been awaiting. Or something.

For example. William's first novel *Neuromancer* swept the Science Fiction Awards and defined the Cyberspace Game. He imagined Digital Cycology and gave names, roles, rules, rituals and geographical labels to those big new, scary, abstract algorithms that are (and have been) changing our Virtual Realities. Ready or not!

The name was "Cyberpunk." The role was Quark. The new digital terrain he called the "Matrix", aka "Cyberspace", aka "Cyberia."

Bill Gibson performs Cycology with grace and style. Like some Cyberjazz Reggae musician, he translates the implausible, impersonal, unpopular, indecipherable equations of The-Way-It-Is into hip human terms. He turns quantum physics into Electric Ladyland! I can think of no higher compliment!

Gibson has produced nothing less than the underlying myth, the core legend, of the next stage of human evolution.

PERFORMING PHILOSOPHY

It pleases me, at this point in time, to say that the literature-art of any culture performs (popularizes) the science/philosophy of that epoch. For one example: the science of Feudalism is theology. Therefore the art-literature-architecture-music of the Cat Stevens Cross & Crescent Crowd celebrates the religious myths and the luxurious life-style of the nobility and the stern Sword & Dagger symbols wielded by the self-appointed special agents of God.

PERFORMING INDUSTRIAL SCIENTOLOGY

For a second example. The science of the Industrial Age involves Newtonian Law-and Order and the equally Dogmatic Injunctions of genetic competition (unnatural selection) hallucinated by Darwin. The art-literature-music of this Factory Culture is institutionalized, socialized, formalized. Like contemporary science, it is obsessed with Size, Quantity, and Replicability.

Please meet the cast of characters: Orchestra Directors. Art Gallery Owners. Officials & Members of the Writers Guild who typically stake-out, colonize and exploit a class or region or genre. The Mystery Story. The Romance. The Biography. The Historical Novel. The Southern Novel. Poetry. The Jewish Novel. Science Fiction.

Literary factory assembly lines. The highly profitable Book of the Month currently owned by TIME-LIFE Inc.! Best Seller Lists! Crown and Walden Book chains! The Pulitzer Prize! The Nobel Prize! Newton, Darwin and the Engineer Scientologist of the 19th century sought to impose law & order upon a chaotic universe. So did the writers.

PERFORMING PSYCHOLOGY

Now. Let me introduce example three, our Science-Lit — the Word Processing of the Post Industrial Age. Quantum Linguistics. Einstein, Heisenberg, Planck, Bohr, Fredkin FAX-ed us the scary news. Who, among us, could handle it? It seems that the universe, from galaxy to atom, is made up of bits of very highly miniaturized units of data. These singular bit-izens of the galaxy are called Quarks. This 15 billion year old information array is literally an electronic telecommunication show. The universe is a bunch of digital programs running, running, running. There are no "laws." And no "orders." Evolution is programmed by algorithms which use the adjacent geometry of cellular automata recursion. The universe is evolving every second with or without you or me.

Here come the Quarks!

There goes the von Neumann neighborhood!

It gets worse! Realities are determined by whoever determines them. The elements of the universe are digital,

electronic, linguistic. Matter and energy are transitory hardware constructions. Organic-Mechanical structures (meat/machine) are thus vehicles for transportation and transmission of Quarks. (Plato & Buddha, it turns out, were early Cyber-punks.)

It gets worse! The human brain is hereby and henceforth owned and operated by an individual. It is equipped with 100,000-K micro-info-centers called neurons and is a miniaturized digital representation of the galaxy that is equipped with 100,000-K mini-info-centers called stars. And, guess what? The universe is equipped with — naturally — 100,000-K mega-info-centers called galaxies. Now let us not be confused by this tech-mech, latch-jockey, engineer-hardware Newtonian Bullshit. Think about it. In the Feudal & Industrial Ages, Size was Everything! Bigger was Better. Darwin was all about Big Numbers. Viral genetics. Spread that sperm, Mr. Macho Male-Man! Infect every dumb egg you can get your penetration stinger into. Replicate yourself, Macho Man. More is Better.

Good news Ladies! In the Info-world, Smaller is Beautiful. Smaller is More. Because it means Singularity. Selectivity. Miniaturization-compaction means Power to the Individual. That noisy, polluting, factory-made Mass-Matter-Energy-Momentum shit that the Male-Order crowd enjoys? It works off static hardware constructed by moronic Newtonian Laws governing Gravity (!), Matter lumbering along at snail pace of C, the Speed of Light. Matter is frozen boulders of information. Matter is thinking by committee, if you know what I mean. Start dissolving matter and you free individual intelligence. This phrase, individual intelligence, is a redundancy, just like Harvard Square. Artificial intelligence is an oxymoron. The alchemists knew this. "Solve et coagulare." Warm it up. Loosen it up. And you free the units of intelligence (Quarks). Free quarks are programmed to link up with other individual data-pax. This is called "jacking in."

Digital information constellations are what count in the Info-Economics of nature. A quark is almost pure information. It has only one hardware function: "Off-On." A Quark probably has as much Cyber-power as an atom. Don't be so impressed by the gigantic atom, spinning around with heavy nucleus and myriads of planetary electrons and space debris. The average atom is the vehicle navigated and programmed by a trillion Quarks. This is not to depreciate the atom, an info-center which has as much Cyber-power as a neuron which, in turn, has as much Cyber-power as a galaxy.

$E=mc^2$ is an engineering blueprint. The basic equation is $I=mc^2$, where "I" am Information. Grammatically speaking, the Quark should be thought of as First Person Singular. Dig it. A single neuron has more information

power than a sun! The exploding star is just noisy hardware! Your brain has more information crammed into it than all the stars in the galaxy. A brick-size cram of digital information is more powerful than Mt. Everest.

Here's a pop version of this principle: an invisible packet of DNA has enough algorithms to grow you an Amazonian rain forest! Or something like that.

This Quantum Reality is unbearably light stuff for a culture of God-fearing up-tight farmers and factory engineers to face. This simple, minimalist Mathématique of apparent disorder seems to offer no mercy to the unprepared. None!

Well, fuck it! What self-respecting Singularity, Quark or Neuron wants mercy, anyway? And, for that matter, who are these self-appointed feudal judges and industrial managers who want to convict a Brain-carrying human, at birth, of indescribable sins/crimes and claim for themselves the power to give mercy? Give mercy to a Quark? To a Brain? To a Galaxy? To a strand of DNA? So?

So here we are, stuck with these Sartrean, Foucault, Fredkin algorithms that have been churning out television signals for 15 billion years and the meter-still-running. The Realities include Koran, Bible, Talmud in addition to peacock feathers, passion-flowers, aphrodisiac resins of certain aesthetic vegetables, Jimi Hendrix tapes, interpersonal computers and the enigmatic smile on your lover's face at the moment of orgasm. If any.

Who can explain these mysterious digital programs?

Who can read us Young Wanna-Be

Quarks nice bedtime stories to make us feel secure about loosening up?

Who can make us feel comfortable with the chaotic science of our wild times?

Who can make us laugh at the structures crumbling before our eyes in Einsteinian smiles because relativity and the fractal nature of the running-programs is always funny. Why? Because it surprises us.

So who will get us giggling like shocked school kids at the Facts of Life? Who will tickle us with accurate disorder? Well, I just told you who! The artists-poets-musicians-story tellers. The popularizers of Quantum Linguistics. James Joyce (who coined the word "quark") taught us elementary word-processing and demonstrated how to atomize the molecules of

JAS. MORGAN

grammar. Think of Joyce as a primitive, pre-digital visionary like Alan Turing. William S. Burroughs was the next alchemical writer to slash the word line, dissolve the chains of static grammatical form, cut-up pages of prose, free the squirming atomic words and let them reassemble in random disorder.

Burroughs and his pal Brion Gysin knew how the algorithms unfolded. IF . . . you free the individual info-units, THEN . . . they will combine in the natural way (i.e. as programmed). Burroughs was the first author to use scientific concepts in his art — no accident, perhaps, since his grandfather and name-sake invented the first successfully marketed mechanical computer. Thomas Pynchon was the greatest and last of the "quantum linguists." (We do not use the nervous term "science fiction" to describe the quantum-science writers.) Classical science fiction was tech-mech fantasy. A serious attempt to impose engineering law and order on the future. Asimov, Heinlein, Lucas et al, were loyal company men using Art in a last, desperate, unfunny attempt to impose mechanical order on the post-mechanical future. The ultimate writer of the industrial age was L. Ron Hubbard. His factory-writ books still sell millions of copies. (These tin can books, engineered by "Hubbard" INC. after his death, sell more copies than Joyce, Burroughs, Gibson combined.)

Pynchon's use of scientific concepts and disorder in his fiction holds a dual excitement, for not only does it sever him from a previous, more rigid and static kind of writing, but it also links him with contemporary artists working in other media who incorporate scientific ideas and seek randomness in their art

—Anne Mangel

Tyrone Slothrop, the anti-hero of

Pynchon's last book, *Gravity's Rainbow*,

fades out, just fuckin'

disappears 150 pages before the end. Talk about "archetypical silence" — Pynchon pulled off the ultimate feat of performance art. He, himself, has become silent and invisible, the first true human-quark, a unit of compacted information, a veritable walking encyclopedia of data, just bobbing around out there among us in the seas of hard and soft realities in which we swim, float or paddle our skin-covered canoes. If any.

This archetypical silence, this deliberate Verbal Impairment of Pynchon "is that same legendary and august renunciation of speech of

which the gesture of Rimbaud is emblematic, but which recurs again and again in the reticence of Wittgenstein, in Valéry's long abandonment of poetry for mathematics, in the testament of Kafka." (Fredric Jameson)

So it is with Gibson, who also remains paradoxically, almost dutifully discreet, satirically evasive, whimsically modest about "the meaning" of his work. What we learn about Gibson comes from snatches of conversations recorded almost accidentally, or cunningly captured on the run by archival fans. Like yours truly.

Believe me, folks, William Gibson did not want to have this conversation (recorded many seasons ago), published. I believe that Gibson agreed, with admirable kindness and sagacity, to have this conversation appear in *MONDO 2000* because it was not taped as "an author interview" but as the record of part of a script-conference for the film of *Neuromancer*, the rights to which (at that time) were controlled by a wealthy woman named Debbie, whose identification with the villain 3-Jane was eerily precise and aesthetically perfect. (I must tell you that all of us who got involved with the *Neuromancer* film project found ourselves caught up in a web of enchantment that changed our lives. Everyone who touched the *Neuromancer* script got what they bargained for, which, in my case, I was pretty happy about.)

William Gibson knows his literary genealogy. He acknowledges his inheritance from the Old Testament Prophet, James Joyce and his New Testament peers, Burroughs and Pynchon. J., P., and B. were frontrunners. They prepared Gibson.

Timing is everything in the info-world. After 15 billion years of evolution Gibson hit that small window — born between 1946-64 in North America. Right on target! Member of the first cybernetic (television) generation. He read Burroughs & Pynchon while earning his Masters Degree in Neurotransmission & Psyberdelics. Of course he was not the only available brain-carrying Info-unit programmed to "flip on." The program had readied a million or so Baby Boom Quarks with the same If-Then algorithms. We were primed to be Gibson fans.

Let me suggest some of the techniques used by William Gibson to illustrate/personalize Quantum Psychology (Cycology).

First we note that all of Gibson's writings, like those of Pynchon and Burroughs, humanize high technology. Sci-Lit. His cyber-tech characters are street-smart, counter-culture, cyber-techs. Digital appliances and space-tech gadgets are just there in the landscape through which his characters move.

His anti-heroes — Case, Bobby Newmark (sic), Bobby Quines, Johnny Mnemonic, Fox's partner in *New Rose Hotel* are "cyberpunks." They are human versions of the basic element of the Quantum Universe. They are Quarks. Prime numbers — divided by themselves (0) and 1.

***His females are shaman ladies,
sophisticated wizards,
playful, humorous, hip diviners.***

Quarks are loners. Free agents. Quarks have minimal hardware power in the material world. They have little interest in, and no loyalty to, institutions. They are alien-ates. Outsiders. Drop outs. Their function is to

activate themselves by "Turning-On" to psyberspace within and to be ready to "Tune-In" (jack-in) to cyberspace on the other side of the screen.

Quarks are free-radical individuals who flip "in" to receive the algorithmic instruction from their neurons and then flip "out" to cybertown.

When they are operating "in" Psyberspace or operating "out" in cyberspace they are pilots navigating the oceans of digital information.

Cyberpunks are bored with "hard reality." They are happiest when operating in the inner or outer Matrix.

Dixie Flatline is the code-cowboy whose wetware-brain was scrubbed and whose Rom-version coached Case through his epic adventures. As his reward, he wished only to be left alone in the Matrix with no involvement in the hard-world.

William's definition of women in the Cybernetic age also deserves admiring scrutiny. Unlike his males, his female characters are strong, independent, effective . . . heroic. And powerfully attractive. They are shaman ladies, sophisticated wizards, playful, humorous, hip diviners.

Gibson's women have more material power, worldly know-how, political juice. Although they rarely "Jack In" with "Trodes." (How inelegant.) They seem more at home in the Matrix. It's as though the women are out there in Cyberia already, watching — with patronizing fondness — the klutzy guys scrambling around in both the material and digital worlds.

Nor can we ignore the global, international, inter-racial nature of his casting. We note his slick mixture of voodoo power, oriental wit and American innocence. He wisely bases his 21st century cyber-culture upon pre-Christian, pre-industrial pagan, feminine, trance cultures. His use of voodoo foundations is nothing less than inspired.

Gibson has cannily called me a man of "fierce enthusiasms." You are hereby advised to raise your skepticism screens when I proceed to tell you that Gibson has produced nothing less than the underlying myth, the core legend, of the next stage of human evolution. He is performing the philosophic function that Dante did for feudalism and that writers like Mann, Tolstoy, Melville, and the Homeric master of the industrial age, L. Rom Hubbard, did for the Industrial Age.

Gibson gives us the cast of characters and the landscapes of the immediate future. Other more influential performing Homeric philosophers may come along to script, direct and screen our futures. But they will consciously and gratefully build upon the foundations given us by Bill Gibson.

And for that we, too, give you thanks, William. ▲

★
"Shine like stars, energize, electrify every word and deed."

☆
From High Priest to MVP ★

☆
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in

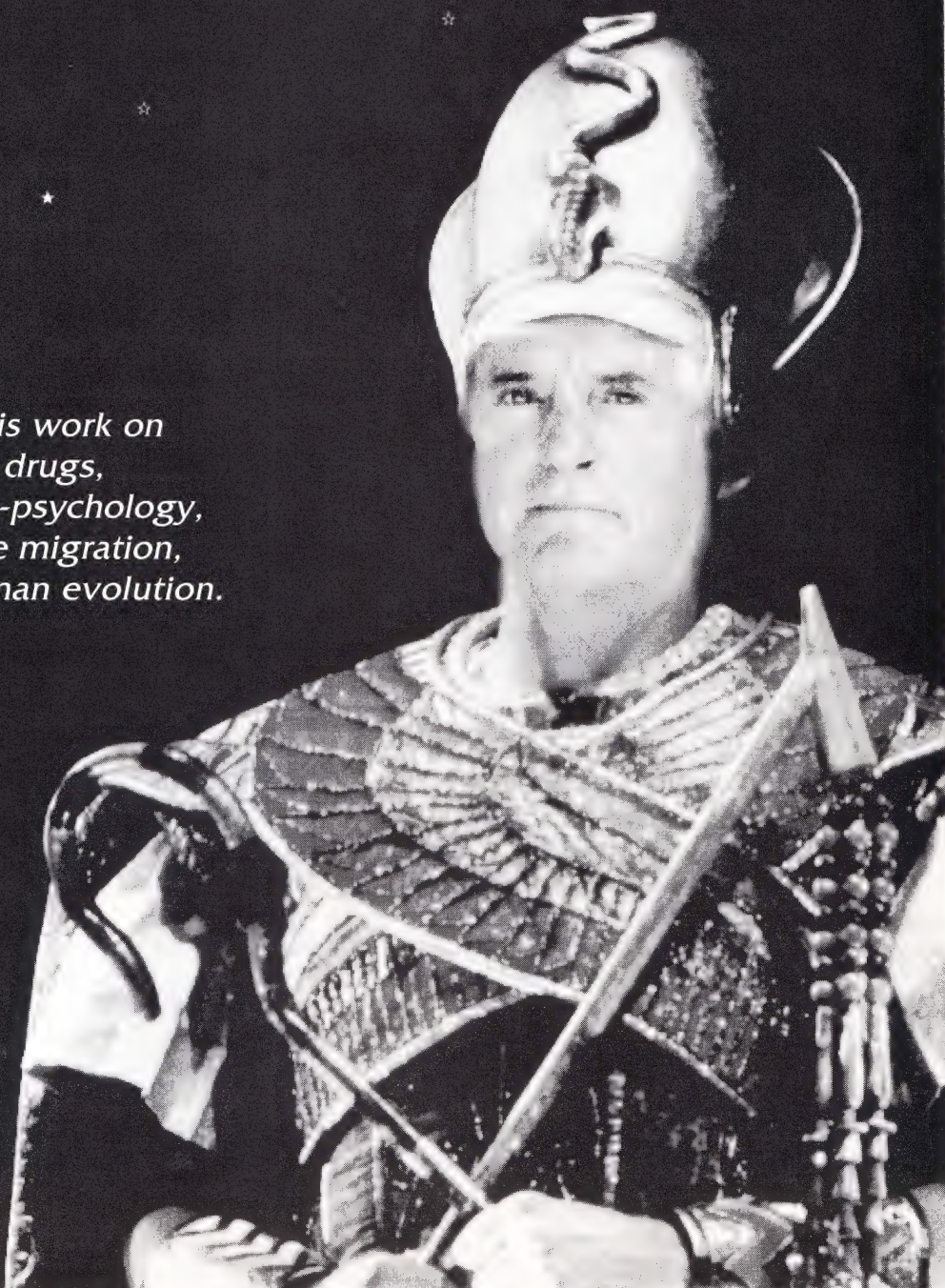
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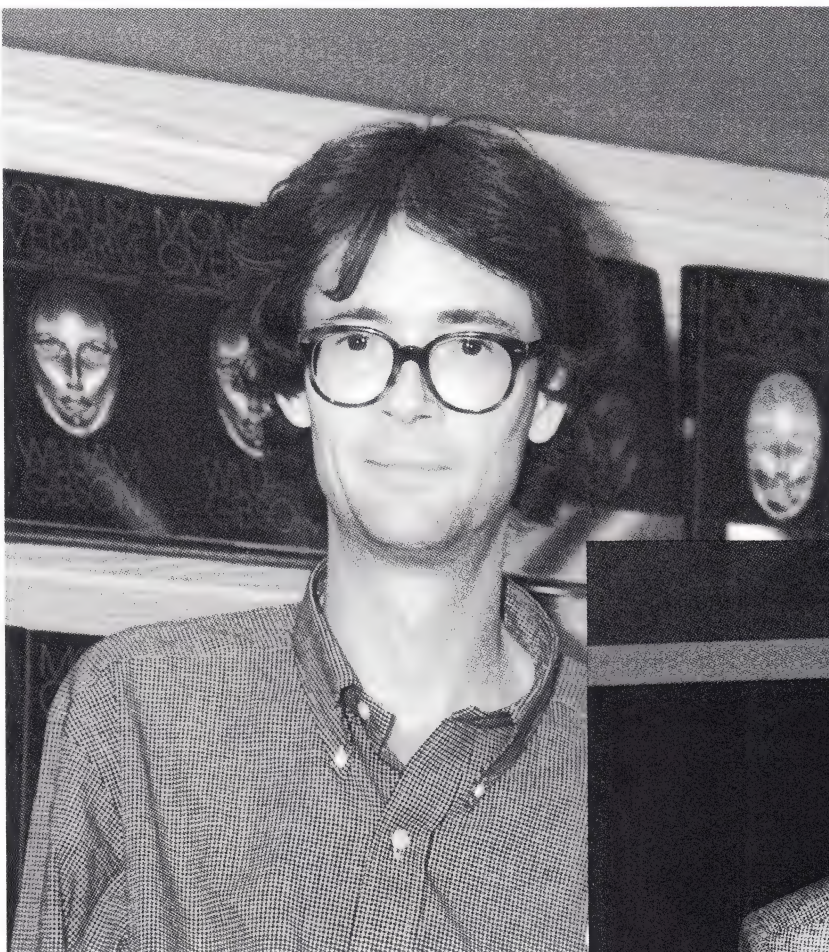
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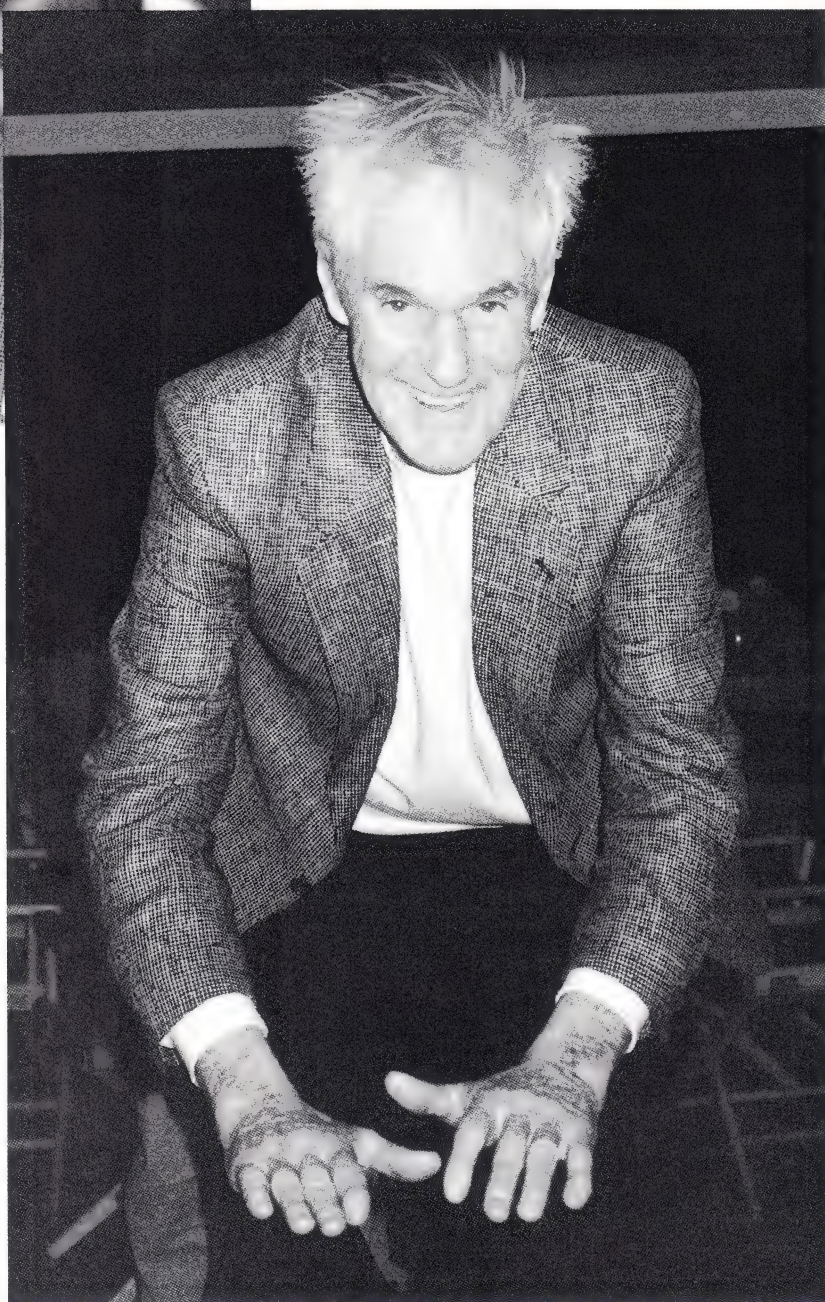


High Tech

High Life

*William Gibson and
Timothy Leary
In Conversation*

JAS. MORGAN



THE SHORT OF IT

TIMOTHY LEARY: If you could put *Neuromancer* into one sentence, how would you describe it?

WILLIAM GIBSON: What's most important to me is that it's about the present. It's not really about an imagined future. It's a way of trying to come to terms with the awe and terror inspired in me by the world in which we live. I'm anxious to know what they'll make of it in Japan.

TRAPPED

WG: Oh, god. I'm starting to feel like Edgar Rice Burroughs or something. I mean, how did Edgar Rice Burroughs finally come to feel about Tarzan in his own heart, you know? He got real tired of it. Wound up living in Tarzana, California.

TL: You'll end up living in a space colony called *Neuromancer*.

WG: That would be OK. I don't think we're going to have this kind of future. I think this book is so much *nicer* than what seems to be happening. I mean, this would be a cool place to *visit*. I wouldn't mind going there.

TL: Where?

WG: To the Sprawl, to that future.

TL: Go up the well?

WG: Yeah. Go up the well and all of that. A lot of people think this is a bleak book but I think it's optimistic.

TL: I do, too.

WG: I think it's actually gonna be more *boring*. I think some kind of Falwellian future would probably be my idea of the worst thing that could happen.

TL: Yeah. That was a wonderful scene where you have those Christians who were gonna mug those girls in the subway.

WG: It's not clear whether they're going to *mug* them or just try to force some *horrible pamphlet* on them or something. Personally, I have a real phobia about guys like that coming up to me on the street . . .

TL: That's a powerful scene! And you describe the girls as like hoofed animals wearing high heels.

WG: Yeah. The office girls of the Sprawl.

TL: Yeah, and they're wearing vaginas, and — Oh, God! That's a powerful scene.

WG: I like the idea of that subway. That's the state-of-the-art subway. It goes from Atlanta to Boston, *real fast*.

TL: You've created a world.

WG: What you're getting when you read that book — the impression is very complicated but it's all actually one molecule thick. Some of it is still pretty much of a mystery to me. You know, the United States is never mentioned in the book. And there's some question as to whether the United States exists as a political entity or if, in fact, it's been Balkanized in some weird way. That's kind of a favorite idea of mine, that the world should be chopped up into smaller . . .

TL: Me too, boy.

WG: West Coast separatism and stuff. In *Count Zero*, I

mention what's happening in California a little bit. One of the characters has a girlfriend who lives in a pontoon city that's tethered off Redondo. Kind of like a hallucinated . . . it's the Sprawl goes Sausalito — the Sprawl but mellower.

At the end of *Neuromancer*, the entire Matrix is sentient. It has, in some ways, one will. And, as it tells Case, kind of matter-of-factly, it's found another of its kind on Alpha Centuri or somewhere, so it's got something to talk to. *Count Zero* starts seven years later, and like Yeats' poem about how the center wouldn't hold, this sort of God-consciousness is now fragmented. It hasn't been able to keep it together. So the voodoo cultists in the Sprawl, who believe that they have contacted the voodoo pantheon through the Matrix, are in fact dealing with these fragmented elements of this God thing. And the fragments are much more demonic and more human, reflecting cultural expectations.

Anyway, I've got to do a different kind of book now, because I'm already getting some reviews saying, "Well, this is good, but it's more of the same stuff." I'm desperate to avoid that.

Burroughs found 50's science fiction and used it like a rusty can opener on society's jugular.

TL: Frank Herbert, who was a lovely guy, wrote a book that's entirely different from *Dune*. It's about humans who became insects up in Portland. Did you ever read it? It's a nice change. In some ways, I like that book as much as *Dune*. He got into an entirely different situation.

WG: Well, he *was* trapped! That's something I'm very worried about. I get flashes of "I don't want to be Frank Herbert." Because even as wealthy and as nice a guy as he was, I don't think he was happy with what had happened to him creatively. He did get trapped. It's different for somebody like Douglas Adams, where I think that the whole thing started off as such a goof for him that it was just a stroke of good luck that he built on. But Herbert was very serious, at a certain point. And then, gradually, he wound up having to do *more of the same*, because, I mean, how can you turn people down when something like that gets enough momentum?

TL: Douglas Adams told me that the three books were one book, and the publisher said split them up into three. He made a million dollars on each one of them. And they're nice. It's a nice tour.

WG: Yeah. They're funny.

TL: These big books . . .

WG: I can't go for that.

TL: I'm glad about that. Norman Spinrad . . . by the way — I love Norman. But I have a terrible problem

with him. He makes them too big. Did you read *Child of Fortune*?

WG: It was too big for me.

TL: Yeah. If he had divided it down the center. If he could only cut it in half.

WG: He wrote a book called *The Iron Dream*. It's a science fiction novel by Adolf Hitler, in an alternate world where Hitler became a science fiction writer. It's a critique of the innately fascist element in a lot of traditional science fiction. Very funny.

ON THE CASE OF CASE & IN THE COURT OF BURROUGHS

WG: For me, given the data in the books, the keys to Case's personality are the estrangement from his body, the meat, which it seems to me, he does overcome. People have criticized *Neuromancer* for not bringing Case to some kind of transcendent experience. But, in fact, I think he does have it. He has it within the construct of the beach and he has it when he has his orgasm. There's a long paragraph there where he accepts the meat as being this infinite and complex thing. In some ways, he's more human after that.



TL: In some ways he reminds me of some of Burroughs' characters.

WG: (*Equivocally*) Yeah. He could be one of Burroughs' wild boys . . . in a way. I'm deeply influenced by Burroughs. I always tell everybody that there's a very strong influence there. I didn't think I'd be able to put that over on the American science fiction people because they either don't know who Burroughs is or they're immediately hostile . . . he found 50's science fiction and used it like a rusty can opener on society's jugular. They never understood. But I was like 15 when I read *The Naked Lunch* and it sorta splattered my head all over the walls. And I have my megalomaniac fantasy of some little kid in Indiana picking up *Neuromancer* and POW!

TL: Well, that happens, baby. Don't worry. There's 500,000 copies already.

WG: I had to teach myself not to write too much like Burroughs. He was that kind of influence. I had to weed some of that Burroughsian stuff out of it. In an interview in London, in one of my rare lucid moments, I told this guy that the difference between what Burroughs did and what I did is that Burroughs would just glue the stuff down on the page but I airbrushed it all.

TL: Burroughs and I are real close friends. We've been through a lot together. I went to Tangiers in 1961. I was there and Burroughs walks in with these two beautiful English boys. I started telling him about these new drugs and, of course, he knew many times more about drugs than anyone in the world! I was just this childish Harvard Professor doing my big research project on drugs. And Burroughs is saying "Oh shit. Here they come. Boy Scouts. And they're gonna save the world with drugs. Yeah, sure." We brought him back to Harvard. He came to the prison project and all. I got to know him very well. He couldn't stand us. We were much too goody-goody. We had hired this black psychologist, as our front, who was also gay. He thought we were ridiculous squares too. So he and Burroughs used to get together at the house, and Burroughs would drink a few gin-and-tonics and the two of them would start teasing us just to see how far we would go. Burroughs would say things like (assuming the dry Burroughsian rasp) "Anyone that says they wouldn't fuck a 12-year-old Arab boy is either crazy or a liar." (*laughter*) It's implied that the crowd that Case hung out with is a drug crowd.

WG: Yeah. This seems to be a world where everybody is pretty much stoned most of the time.

TL: That first chapter . . . whew!

WG: I had to go over and over that. I must have rewritten it 150 times.

TL: I'll bet. It's like a symphony or a fugue. This is the fifth line in the book; "It's like my body developed this massive drug deficiency. It was a Sprawl voice and a Sprawl joke." (*Laughs*) Of course, his life was jacking in.

WG: Oh yeah. He just lives for . . .

TL: Cyberspace.

WG: Yeah. For cyberspace.

TL: Would you describe cyberspace as the matrix of all the hallucinations?

WG: Yeah, it's a *consensual* hallucination that these people have created. It's like, with this equipment, you can agree to share the same hallucinations. In effect, they're creating a world. It's not really a place, it's not really space. It's notional space.

TL: See, we live in that space. We that are hooked up to *Neuromancer* are living in that consensual hallucination.

WG: Yeah. In a sense.

**McLuhan's revenge. Media monsters
... the worst street gang you ever ran
into were, at the same time, intense
conceptual artists.**

ON MOLLY

WG: I didn't think women would go for the Molly character very much. I've really been surprised at the number of women who have come up to me and said, "Molly's great. I really got off on her." I think America is ready for a female lead who beats the shit out of everybody.

TL: Molly says "You like to jack in. I've gotta tussle." That's a beautiful two-liner.

WG: I was originally gonna call this book "Jacked In." The people at Ace said it sounded too much like "Jacked Off," but that was my first thought for a title.

Molly's tougher than Case because Case is the viewpoint character, and I wanted an enigmatic character. So, she's more shut off from me. It's the symbolism of the sunglasses. He never even finds out what color her eyes are.

TL: And making love, she says ...

WG: "No fingerprints." (*General, all-around laughter*) Yeah, she's a tough one for me to do because that's some kind of image from my ... She's a *Bushido* figure. When she says she's street Samurai, she means it quite literally. She has this code. And it may grow out of a sort of pathological personality, but it still is her code.

TL: What was that segment where she was like in hypnosis so she didn't know what was going on?

WG: Oh, they use a sort of sensory cut-out, so that she isn't conscious when this stuff is happening, but her motor system was being run by a program. So, in effect, she became kind of a living sex shop doll. Programmed. The people who write the program are in Berlin. She says "They have some *nasty* shit there."

Actually, this starts in *Burning Chrome*. That's where it comes from. One of the key things in that story is when

this guy realizes that his girlfriend is working in one of these places in order to buy herself an improved pair of artificial eyes. I described it a little more clearly in that story. The prostitutes aren't conscious. They don't remember. In *Burning Chrome*, the guy says the orgasms are like little silver flares right out at the edge of space, and that's the ...

TL: That's the guy's orgasm, not hers. She's not even feeling it.

WG: Well, she can feel a little bit, maybe ...

ON RIVIERA, ARMITAGE & LUCAS YONDERBOY

TL: What would you say about Riviera?

WG: Riviera is like some kind of terminal bag-person. He grows up in a radioactive pit with cannibalism pretty much the only way to get along. It's like *Suddenly Last Summer*. Ever see that? Where the guy's ripped apart by the little Mexican children? Well, Riviera is like that, a feral child. He's smart, incredibly perverse. But all the stuff that he does — the little projected hallucinations and things — are relatively low tech. He's just projecting holograms.

There's this amazing German surrealist sculptor named Hans Belmer who made a piece called "The Doll." He made a doll that was more his fetish object than a work of art. This totally idealized girlchild that could be taken apart and rearranged in an infinite number of ways. So I have Riviera call his piece "The Doll." Belmer's doll. Riviera also represents the fragmentation of the body. People see things like that, sometimes, out of the corners of their eyes.

TL: What about Armitage?

WG: He's a synthetic personality, a character utterly lacking *character*. As Molly says, "This guy doesn't do anything when he's alone." It's some kind of post-Vietnam state.

TL: I can see certain Gordon Liddy qualities in Armitage.

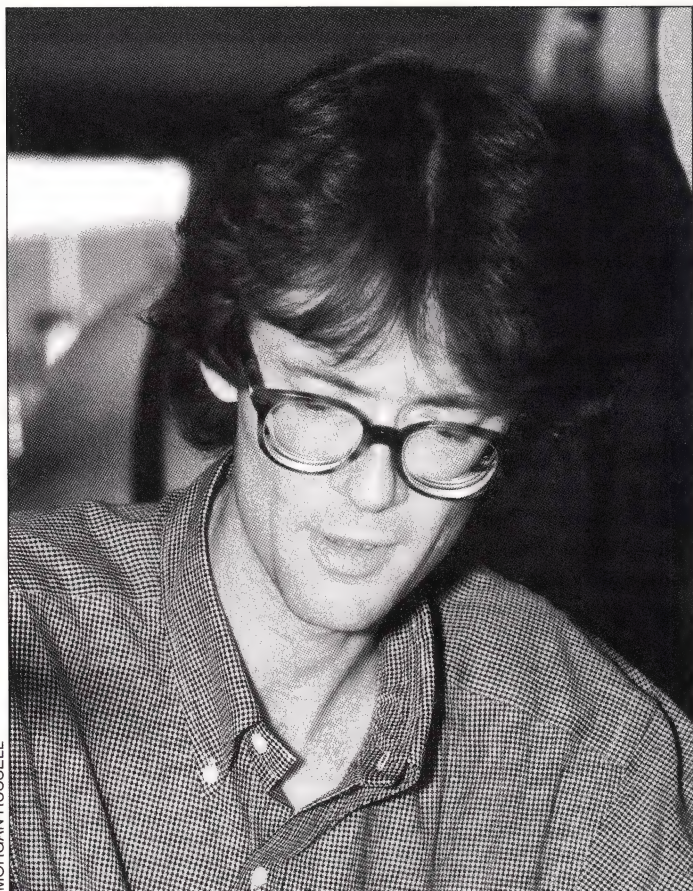
WG: Yeah, I saw a video of his *Miami Vice* performance without realizing it was Liddy. When I saw that I thought of Armitage. This book's fraught with psychotics.

TL: (*Laughing*) You see, there are a few of us who think it's a very positive book in spite of that.

WG: Yeah? Really? Well, I just try to reflect the world around me.

TL: I know. You're a mirror. Yes. How about Lucas Yonderboy?

WG: Lucas Yonderboy was my reaction to the spookier and more interesting side of punk. Kind of young and enigmatic. Cool to the point of inexplicability. And he's a member of the Panther Moderns. They're sorta like Marshall McLuhan's Revenge. Media monsters. It's as though the worst street gang you ever ran into were, at the same time, intense conceptual artists. You never know *what* they're going to do.



ON PYNCHON & STERLING

WG: Bruce Sterling is my favorite science fiction writer. *Schismatrix* is the most visionary science fiction novel of the last twenty years or so. Humanity evolves, mutates through different forms very quickly, using genetic engineering and biochemistry. It's a real mindfucker. When he first got it out and was getting the reviews back, he told me "There are so many moving parts, people are scared to stick their heads in it." People will be mining that, ripping off ideas for the next thirty years.

TL: Like *Gravity's Rainbow*.

WG: Yeah. That's one of my personal favorites. Have you ever met Pynchon?

TL: Ohhhh... I had him tracked down and I could've. It was a deal where there was a *People* magazine reporter with an expense-paid thing. We were going to rent a car and pick up Ken Kesey. Pynchon was living up near Redding, Pennsylvania. We had him tracked there. And I decided I didn't want to do it. I've said this to many people, so I should say it to you. Your book had the same effect on me as *Gravity's Rainbow*.

The way I read *Gravity's Rainbow* is pretty interesting. At one point, the American government was trying to get me to talk. They were putting incredible pressure on me. This FBI guy said if I didn't talk... "we'll put your name out at the federal prison with the jacket of a snitch." So I ended up in a prison called Sandstone. As soon as I got in there, there was a

change of clothes and they said, "The warden wants to see you." So the warden said, "To protect you, we're going to put you here under a false name." And I said, "Are you crazy? Are you gonna put me on the main line?" And he said "Yeah." I said, "What name are you going to give me?" He said, "Thrush." And you know what a thrush is? A songbird. So I said, "Uh-uh. In a prison filled with dopers, everybody's going to know that my name isn't Thrush. I refuse to do it." He says, "OK. We'll have to put you in the hole." And I said "Do what you gotta do — but I want to be out there in my own name. I can handle any situation. I can deal with it. I've been in the worst fucking prisons and handled it so far. So I can handle it and you know it. So fucking put me out there!" And he said, "Sorry." He was very embarrassed because he knew. He was a prison warden. His job wasn't to get people to talk or anything like that. He knew it was a federal government thing. The reason they were trying to get me to talk was to protect the top FBI guys that had committed black bag burglaries against the Weather Underground. So they wanted me to testify in their defense. They actually went to trial, if you remember, and got convicted. And were pardoned by Carter.

I think America is ready for a female lead who beats the shit out of everybody.

Well, they put me in the worst lock-up that I've ever been in, and I'd been in solitary confinement for over a year and a half. This was just a clean box with nothing but a mattress. The only contact I had with human beings was, five times a day, I could hear somebody coming down the hall to open the "swine trough" and pass me my food. And I'd say, "Hey, can I have something to read?" And they'd say, "No." One of them was this black guy and, this one night, he came back. I could hear him walking — jingle, jingle, jingle — walking down the metal hall. He opens up the trough and says, "Here man," and throws in a book. A new pocketbook. And it's dark, so I waited 'til dawn and picked it up. And it was *Gravity's Rainbow*.

WG: Perfect! Of all the books you could get, that'll last you a while.

TL: You should only read that book under those circumstances. It is not a book you could...

WG: It stopped my life cold for three months. My university career went to pot, I just sort of laid around and read this thing.

TL: What I did — first of all, I just read it. I read it all day until dark when they turned the lights out. I woke up the next morning and read it. For three days, I did

nothing but read that book. Then I went back and I started annotating it. I did the same thing to yours. Yours is the only book I've done that with since. The film industry's never been able to do anything with *Gravity's Rainbow*.

WG: It's got 8 billion times more stuff in it than *Neuromancer* does. It's an *encyclopedic* novel.

TL: But there's a tremendous relationship, as you well know, between *Neuromancer* and Pynchon. Because Pynchon is into psychology. The shit he knows about! It's all about psychology. But you've taken the next step because you've done that whole thing to computers.

WG: Do you think he'll ever write another book? I know people who claim to have seen clearly, in *Gravity's Rainbow*, that the guy would never write another book, that somehow it's innate to the structure. Of course, one is extremely curious . . .

TL: There was an article in *Esquire* . . .

WG: You know, this guy makes Salinger look like Boy George. The levels of secrecy that surround this man. I know a man in Vancouver who claims to have washed a sinkful of dishes at a Christmas party with Pynchon. Not the kind of guy who would make up a story. I think he may be the only person I've ever run into who's actually spoken with . . .

TL: I've met several who knew him earlier. And do you know what all the stories are? He wrote *Gravity's Rainbow* down at Huntington Beach. And he would wake up — he was taking a lot of LSD — and he'd wake up the next morning and reread what he'd written and he didn't even remember what he'd been writing about.

WG: Well, a lot of it *reads* like that.

TL: By the way, I have some marijuana brownies if you wanna . . .

WG: Oh God no. I suffer from Cannabis dysphoria.

TL: (laughs) That's a *Sprawl* joke. So Pynchon disappeared. There's only one picture of him, and that's in the Cornell yearbook. He's totally disregarded author tours, and coming on the Donahue show — all the hype and awards.

WG: He even set up some kind of legal thing to block his high school from revealing any of his records. All of his Naval records were destroyed in a "draft" bombing . . .

TL: The hero of the book is Slothrop. And you're reading and reading and reading the book and suddenly, towards the end, you realize that the hero had disappeared and you haven't seen him in about a hundred pages.

WG: That is the weirdest thing in the world!

TL: And you have to trace back. I traced back to the last time. Do you know what the last thing is that happens?

WG: It just trails off.

TL: The last time you see the character, he's up on a mountain in Germany, and there's a little stream. And he's kind of — his memory is dissolving. And there's a harmonica in the stream that was the one that Malcolm X dropped in the toilet at the beginning of the book.

And that's the end. But it just keeps going and Slothrop never reappears and you don't notice he's gone. Is that a way to end a book or to end your life?

WG: Yeah!

TALKIN' MOVIES

WG: What I really want the special effects guys to do is to make you see, from Case's point of view, the little acid giggies. I've never seen that in a movie . . . It'd be very easy to do with animation and so forth . . .

TL: Trails.

WG: The little lines and trails coming off of things . . .

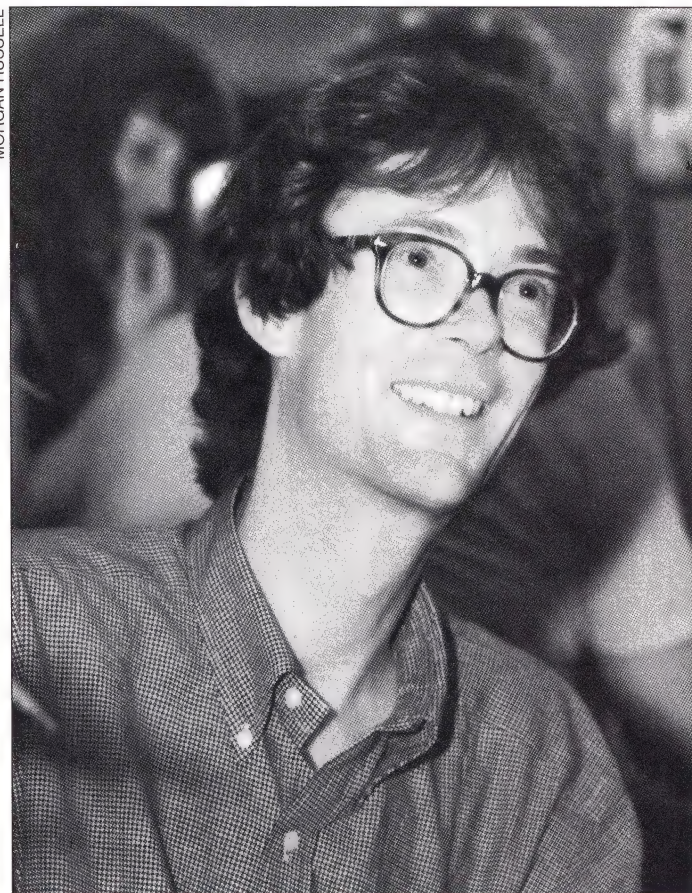
ON THE COMPUTER GAME

TL: The computer game will be an electronic novelization of the movie. The computer program can get into all kinds of incredibly complex details that the movie can't. You simply can't have all that history. It would take them 100 episodes.

WG: Do you have people who write these things for you? I know of at least one circle of people in New York who hustle interactive fiction — a bunch of writers who are coming up and they're probably never even going to write books. They work only in interactive.

TL: Mike Berlin is a friend of mine. He says he's the first writer to write interactive fiction. He was a science fiction writer before he got into info-com. And he was very badly treated by the computer people, who live in a world of their own.

MORGAN RUSSELL



WG: The danger, for me, with continuing something like this even a little bit, is that you box yourself in. You box your imagination in.

DRUGS OF CHOICE

WG: Can I get a beer, Tim?

TL: There's one cold and I'll put another six in the freezer so maybe we should pour glasses of . . .

WG: I prefer mine warm. I'm very British that way.

TL: You don't have any new drugs in *Neuromancer*.

WG: I've got the beta-phenethylamine. When that hits the street, watch out!

TL: That's the one that makes your teeth . . . the nerves.

WG: Yeah. That's actually a brain chemical. We all have a little bit, as we sit around the table. But you'd have to get it out of forty million people. Sort of like the Hunter Thompson story about adrenochrome. If you could eat somebody's pineal gland, or something . . .

TL: That's a very powerful drug experience that you describe, where he can feel it in his teeth.

WG: Yeah. I had a lot of fun writing that. *(Laughs)*

TL: I know you did. I appreciate the disciplined work that went into that!

WG: Beta-phenethylamine is the chemical that the brain manufactures when you fall in love — the level rises. I didn't know this when I wrote the book. I called Bruce Sterling in Texas, and I said, "This guy's been modified so he can't do traditional stimulants. So, what can he get off

on?" And Bruce said, *(in laconic Southern drawl)* "beta-phenethylamine." It's in the book. Beta-P. Actually, some people have called me on how I spelled this in the book. I never checked it. So I may have misspelled the name of the *real* brain chemical. About a month after I finished the book, there was an article in *Esquire*. I think it was called, "The Chemistry of Desire." And they talked about beta-phenethylamine, which is structurally similar to amphetamine. And it's also present in chocolate. So there's some possibility . . .

TL: Ohhhh! I'm a chocolate addict. Notice last night, how the waiter automatically brought me an extra plate during dessert? They know my weakness. Double-dose Tim.

WG: Japanese kids get high on big candy bars that are just sucrose and caffeine. They eat five or six of these things and go to concerts on this massive sucrose-and-caffeine high.

***I've got the beta-phenethylamine.
When that hits the street, watch out!***

DIRTY STORIES

TL: You had a story in *Omni* called "Dogfight" . . .

WG: Yeah. I did that with Michael Swanwick. I had this image . . . So he went home and thought about it and came up with a rationale for the image, these tiny World War I bi-planes dogfighting over a pool table in some redneck bar in Virginia. It was a very unpleasant story.

TL: It was very unpleasant! The saddest story I've ever read! One of the things that's wonderful about *Neuromancer* is that there is this glorious comradeship between Molly and Case. And he sings to her while she rubs her nipple and she's talking to him and telling him.

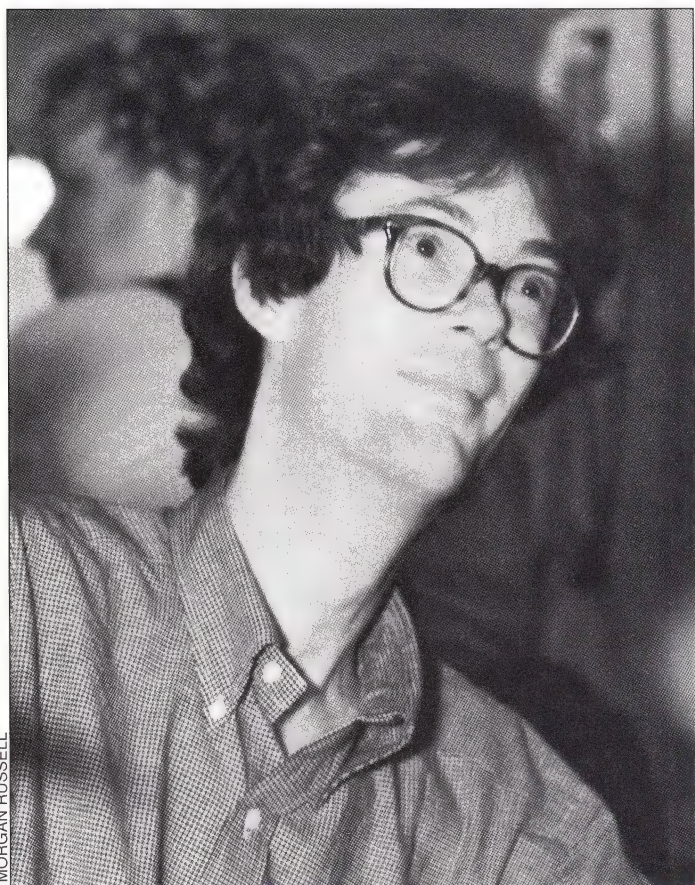
WG: How they gonna do that in the movie?

SON OF NEUROMANCER

WG: There's no *Neuromancer Part II*.

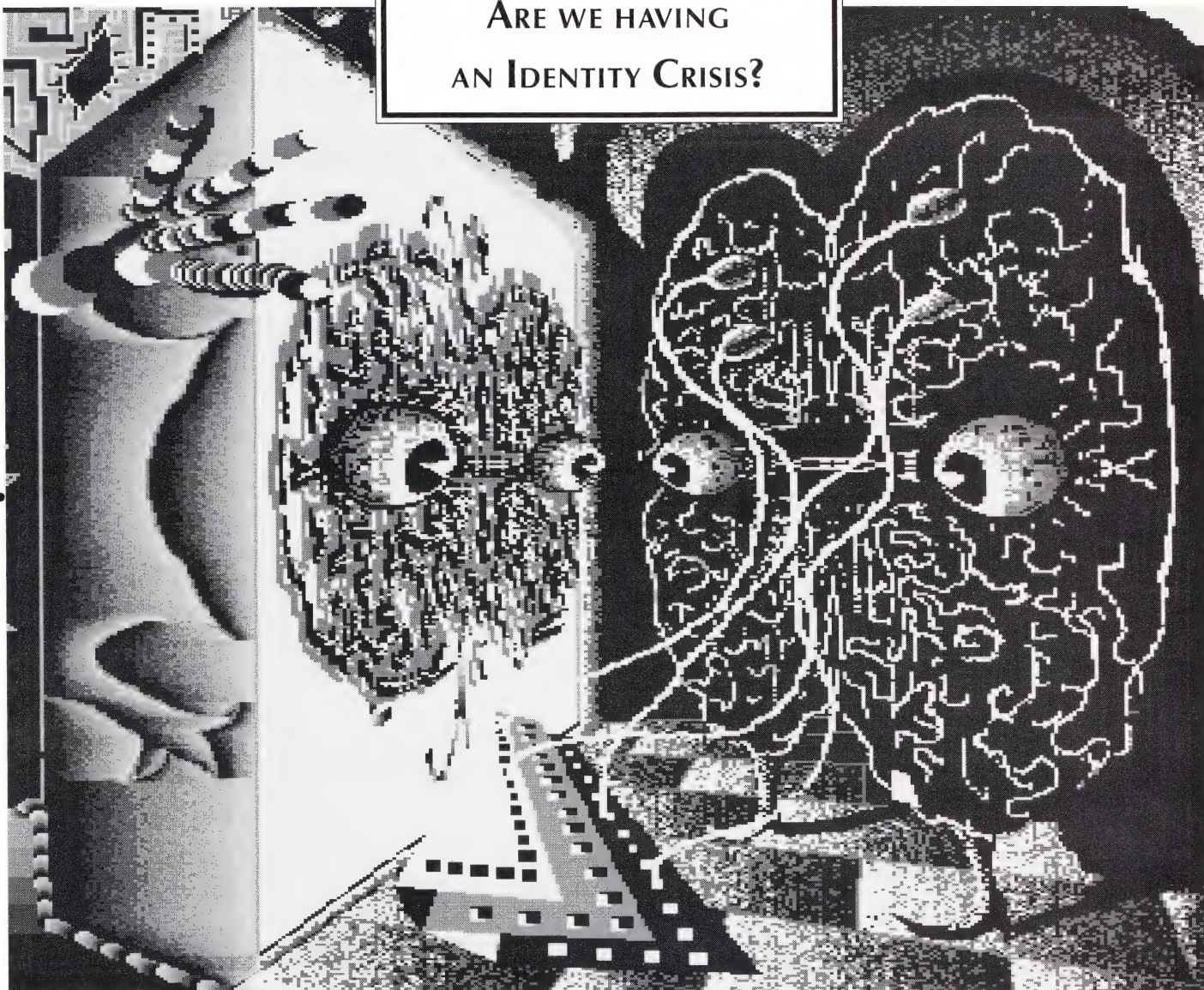
TL: Case and Molly have children. . .

WG: *Son of Neuromancer*. People have children in *Count Zero*, which was a real breakthrough for me. I was trying to up the ante. I like *Count Zero* better. *Neuromancer*, for me, is like my adolescent book. It's my teenage book — the one I couldn't have written when I was a teenager. ▲



MORGAN RUSSELL

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CUT HERE



The Rise and Fall of Max Headroom

*Michael Synergy
talks to
Peter Wagg
and
Steve Roberts*

Cyberpunk television. The literary cyberpunk movement has deep roots — Bester, Delany, Burroughs, even Toffler's *Future Shock*. But other media have little heritage to build upon — with notable exceptions: *The Prisoner* episodes seen on television, and Ridley Scott's *Blade Runner*. Out of this relative vacuum *Max Headroom* has emerged as the premier expression of cyberpunk.

You could see cyberpunk as a dystopian view of the effects of technology and trace its antecedents as far back as H.G. Wells or Sir Thomas More. While that sector of the population that still reads can appreciate cyberpunk, both *Max* and *The Prisoner* saw little success; and *Blade Runner*, while a cult classic, did not fare well at the box office.

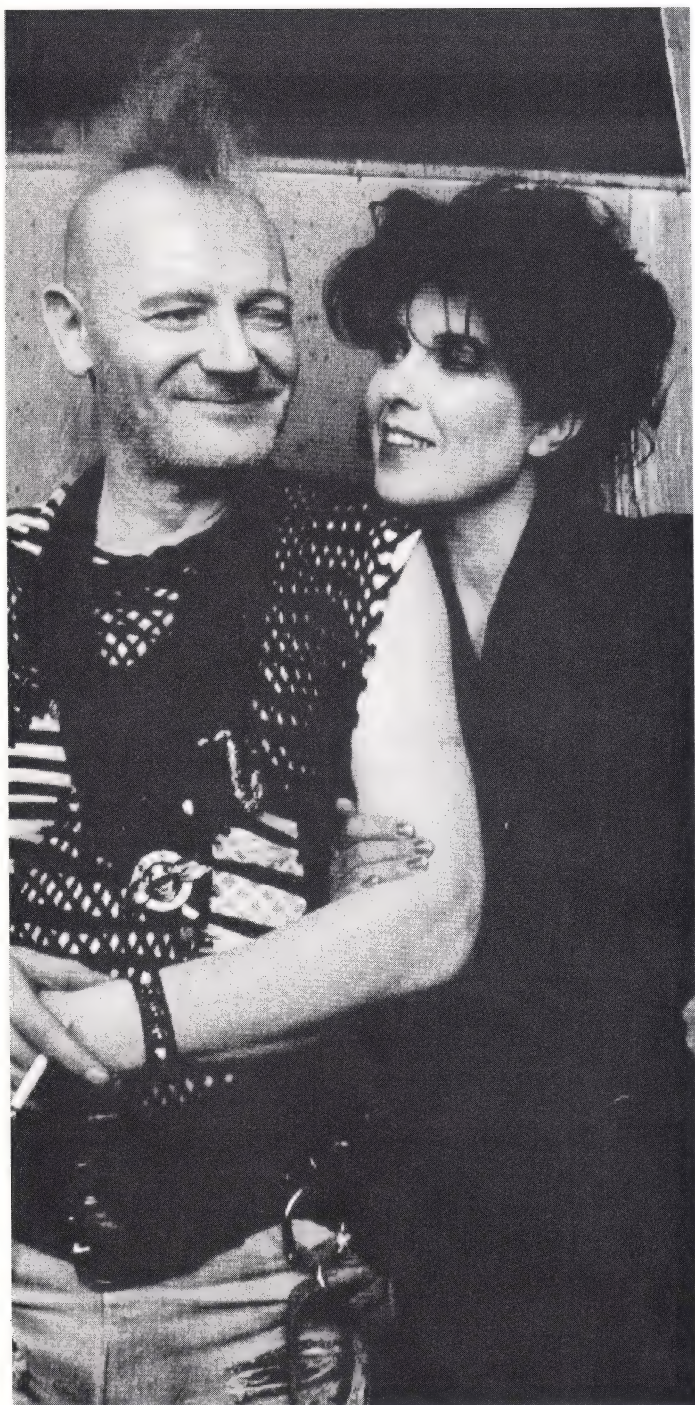
Peter Wagg was the producer for the original British *Max Headroom* and the later American version. Steve Roberts wrote the original screenplay for the British version and the main body of the American episodes. Both of these men have produced a

glimpse of what may come, a technically dazzling view of the murky future. They have taken trend analysis and shown how apparent technological advances could turn out to be appallingly retrograde. Organ transplants, for example, would instantly create a black market for vital organs.

Their mordant genius has not struck a responsive chord in prime-time TV. Their vision is too piercing, too unpalatable for middle America. It addresses a new mutation, a new segment of humanity that has not yet been counted and will resist any attempt at a census. Sadly though, this means that we are deprived of the continuing adventures of *Max* or *Number 6*.

But the geniuses behind this look at the proximate future are still producing — and have their vision which they are bound to share with us, or at least those of us who look through mirrorshades.

—Michael Synergy



Michael Synergy interviewed Peter Wagg and Steve Roberts separately by telephone. We've spliced them together along with outtakes from the original Max Headroom script.

THE R-R-R-RISE OF MAX

"Oh, yes," said Bryce. "But you know it really isn't my problem. My brief was to stop channel switching. I mean I only invent the bomb — I don't drop it. Ha ha!"

If you live in Iowa and watch Dallas every week, you tune into Max and you think you've got some Russian satellite station!

MONDO 2000: How did the Max idea originate?

STEVE ROBERTS: The idea originated with a request to my friend, Peter Wagg, from Channel 4 in England. They asked him to put together an original pop video show of some sort. They'd tried it all; fat men, thin men, the whole circus — they were always trying all kinds of people as VJ's. Anyway, I was standing in a pub, which is where all the best ideas happen in England, with a guy called George Stone, and someone suggested having some sort of a computer-generated figure. Nothing more than that notion.

Then, in order to introduce the character, it was suggested that a short film, almost a cartoon, be made. We were going to show in 5-10 minutes how this character comes to life. But Peter Wagg realized that here was a story that had all kinds of other values. So he suggested that this become a one-hour piece that would air just before the start of a new pop video series.

At this point, Peter talked to Colin Wilson. We were interested in his understanding of all the left-brain and right-brain stuff, because we figured we were dividing the main character up between his conscious mind and his subconscious mind . . . or something like that. We didn't really know, but we knew Colin would help. So we trekked off to Gornhaven in remote Cornwall to meet with Colin . . . it was great. We stayed in the world's worst hotel. It was run like *Fawlty Towers*. We had two or three meetings with Colin in the evenings, not only on the mind, but also on how to bend it — in this case by providing quantities of fine wine, one of his many areas of expertise. During the day we would sit drinking on a terrace at the hotel and throw around ideas. It was there that all these characters like Brueghel and Mahler and Bryce started to evolve.

M2: And, of course, the Bryce character changed from a Mad Scientist into a pubescent computer hacker because of Colin Wilson's son.

SR: Absolutely. Colin Wilson said, "My son has had an idea. He thinks Bryce should be fifteen," and we all jumped up and down and said, "Hey, that's great!" I had a marvelous time writing it, because I just sort of let loose and Max popped out.

Max Headroom was born. Across the sad ghettos his face flickered on a thousand screens. This weird, funny, erratic, unpredictable, iconoclastic figure tickled the parched imaginations of the thousands of derelicts who gathered for warmth around the video campfires of the city.

M2: The original British one-hour program we saw here in the U.S. on Cinemax, which involved some work by Colin Wilson, was really the best *Max Headroom* program, I think. Most of the sci-fi crowd prefer the purity of the original British episode.

PETER WAGG: Well, I do too. The British one was a very, very special piece of work for all of us and we were all intensely proud of it. And, in fact, when you called I was watching it to show someone the difference between that and what we did over here. I'm also proud, though, of the first one hour that we did in this country, for a different reason. I dreaded, frankly, remaking something that, in all our eyes, seemed the ultimate thing that we wanted to do. But, of course, the English show was designed specifically to be an introduction to Max as the VJ of a half-hour rock video show, a sort of pilot for a video clip show. Consequently, you have the story of Big Time television and how Max goes to Big Time and becomes an on-air video jockey. It was 57 minutes long, and an American network TV hour is 46 minutes. So, to start, we had to cut 11 minutes. Also we had to set up what would be a pilot for a weekly one-hour series of Edison Carter/Max Headroom shows. So we obviously had to have Max and Edison meet — we had to set up what the audience could expect to see every week. So these were two very distinct challenges, if you like. Consequently, we changed the story about halfway through to rinse out Big Time, which was superfluous to the story we had to tell, although we introduced it in show two. No way were we going to lose Reg and Dom . . . but we had to Americanize it to a degree.

M2: Are you completely happy with the shows that have aired in America?

PW: Oh yeah.

"Listen Ben," said Grossman, "Bryce is a problem. Now that he's on to this 'Computer Generated People' business he doesn't want to know about Blipverts. He thinks his parrot programme is some sort of breakthrough."

THE FALL OF M-M-M-MAX

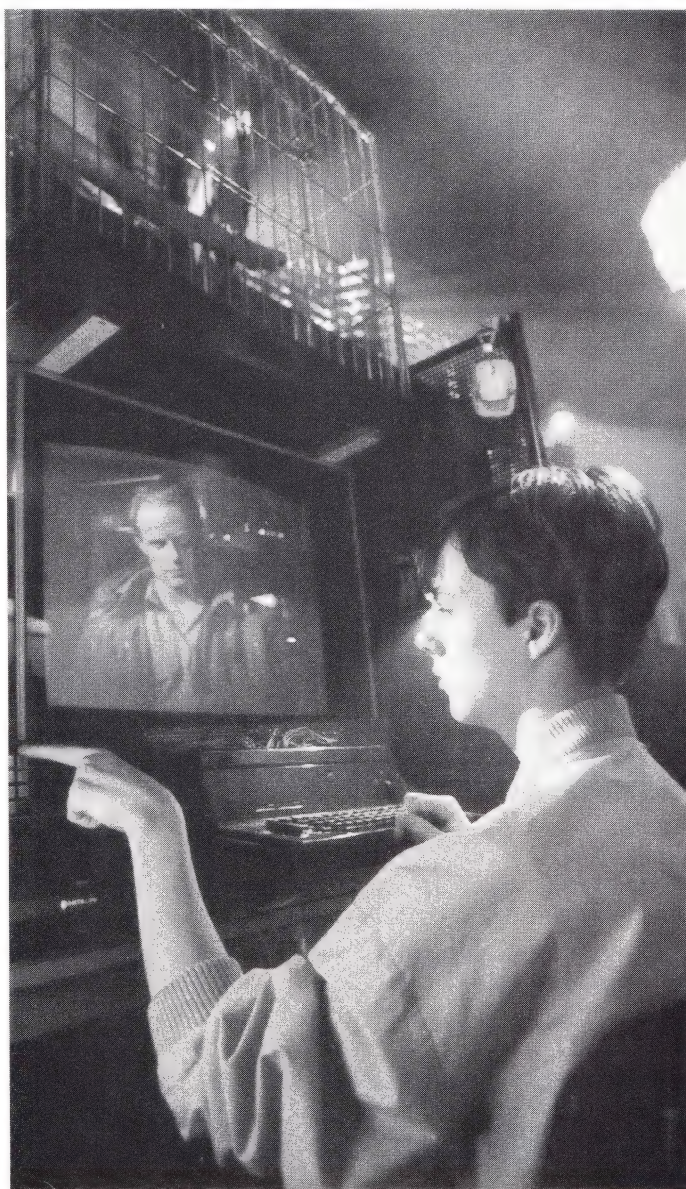
"Ma ma ma ma mamamama ma max max Headroom mamamama . . ." gibbered the image. Grossman stared like a frog facing a watersnake.

"Max Headroom! What the hell? Goddamn it! Get that babbling clown off the screen. Kill it. What kind of a screwup is this, Bryce? Is this a joke!"

Grossman jabbed at the keyboard.

"Leave him alone. Don't you dare touch him."

"Him!" boggled Grossman. "Him? This junk is a machine. It is not Edison Carter. It is a computer-generated geek!"



M2: Was the cancellation due to poor ratings alone?

PW: Yes . . . just the ratings. I mean, my relationship with ABC was extremely positive, very productive . . . and I'm not just trying to sound like a producer being gracious. Brandon Stoddard is, to my mind, a real producer's president. He inspires you. He motivates you and gets excited by what you're doing. He gave me full license with the show. He would always say to me, "Just do what you want to do." And we did. You can ask Steve Roberts the same question. We really did do the show as we wanted to.

M2: The cyberpunk underground assumed that it was probably too sophisticated for the general viewing audience.

PW: Well, as they like to say in America, the bottom line was we just weren't getting the ratings. Which can mean many different things. There are only 1,200 homes that carried the "people meters" (formerly



Nielson boxes). It seems to me that when you have 1,200 people responsible for the rating system and you've got 25 million Americans — it's not a true reflection of what people are really watching. So, to me, the rating system has some real inadequacies. But it is the system and you live and die by it.

I definitely think the show was ahead of its time. If you live in Iowa and watch *Dallas* every week, you tune into *Max* and you think you've tuned into some Russian satellite station! And you'd flick over to *Miami Vice* or whatever feels more comfortable . . . or at least those 1,200 people felt more comfortable. Obviously, we were stronger in areas like New York, Chicago, L.A. But we tried to do something that was sophisticated and intelligent. Stories that were told in a whole new language — mixing videotapes, film and graphics. And it was a shock to the system. People either loved it or they just didn't get it.

. . . he heard the morning television shows ebb and flow as the doors passed by . . . "Mr. Beefies Bisonburger injected at source with all the relishes . . . Hello Nyasaland welcome to global Song of the Century . . . "The camera swung up the stairs of the dreadful, spiritless ghetto. A huge distorted face filled the screen as a woman stared into the camera and bent to collect something from the floor . . . "Asian Premier Kysoty reports full foodbanks for the next quarter . . . and now from Zikzak, the world's biggest corporation, comes 'Musquash,' a combined fly-killer and deodorant . . ."

M2: Personally, I felt you were addressing — with the language and the feel of the show — the counterculture that I'm a part of. So for me, it was a fantastically fun show to watch.

PW: I just think, "Face it! They just couldn't understand it." Also, you had to watch from the moment it started until the moment it finished. You couldn't dip in and out of it. It was a very layered show; you could videotape it and rewatch a few times and pick up lots of things you'd missed. I felt very proud of it, as did the crew, the cast. *Everybody*; the studio, the network. But some people just couldn't get inside of it.

M2: It's interesting that *Max Headroom* could be on the cover of *Newsweek* magazine and, in a few short months, completely disappear off the face of the earth.

PW: Yeah. It's a very transient world. New people are coming in all the time, new shows — just like rock 'n' roll. It moves on. I still get stacks and stacks of fan mail. Clearly, there's an awful lot of people out there that would love to see *Max* back, in some shape or form.



He switched off the erratically rotating globe which bore the legend 'Big Time Television.'

"You are tuned into the wired society. This is Big Time Television, day after day making tomorrow seem like yesterday."

Expressionless faces stared at his face crackling over the illegal airwaves.

"You know we said there is no future?" he continued cheerfully, "Well, this is it."

BREAKTHROUGH TV

The controller traced the reporter's position with his cursor. He spoke swift instructions to a pilot 8,000 miles away. Beyond him another controller hunched over his desk. "Your satellite will be over the horizon in two-five seconds."

While another, arms raised in horror yelled, "Annie, I know it's an important interview but you can't just smash the window in. I mean, holy shit, it's the Vatican!"



Television is the greatest cyberpunk invention of all time. It is, at once, magnificent and horrific.

PW: I've sadly gotten out of the habit of talking about Max . . . but I could talk for a week about it, I love it so much. It really was so — it's an overused expression, now — but we coined the term "cutting edge" for Max. My nickname from the crew was "Breakthrough," because I always used to call it Breakthrough TV. We consciously tried not to make every show a *total* satire of television since, ultimately, that would get a bit boring. We tried instead to do really *good* TV . . . take relevant present-day subjects and just extrapolate them a bit, push them twenty minutes into the future. We'd take a story . . . do you remember that Captain Midnight guy?

M2: We ran a piece on pirate TV a few issues back.

PW: I mean, that was a natural. The writers were briefed by Captain Midnight about satellite pirating. That became *Academy*, the first American show. And we took present-day artificial childbirth techniques and computer security systems . . . and just set them into the context of the show.

Deep in the many-levelled basement of the network tower an armored van stood amid scattered wreckage. Close by it, poking about among a macabre selection of items was Mahler. Around his waist were strung the plastic bags into which he sorted severed limbs of accident victims.

Within the van, Brueghel, his partner, a thin reed of a creature, an insect beside Mahler's blubbery frame — replaced a handset on its rack.

"Yes sir, there will be the usual expenses?"

"Got a nice accident?" asked Mahler, ever eager to ply his trade.

HERE COMES CYBERFORCE!

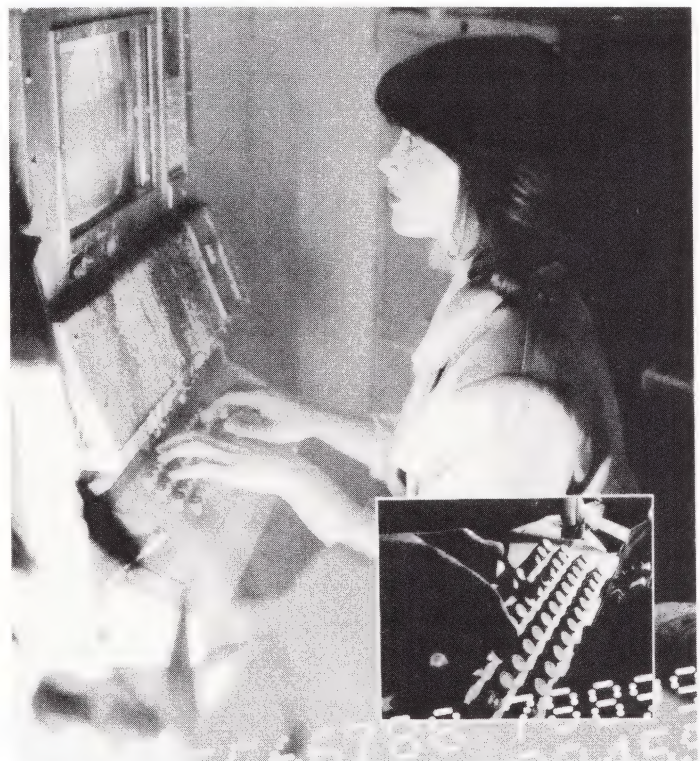
"Picture good. Balance fine. Your link locked and strong. I'm cutting up time code." Carter was carrying his camera low in one hand. The picture was clear. It seemed to skim over the ground, its eye noting debris and filth on the streets, now and then catching darting, furtive figures. Carter was in one part of the vast dereliction that was the city. In this dangerous world Gorrister was more than a trained technician handling the battered but complex machinery of the great satellite links. He was at Carter's side — ahead, behind and above him. Whatever Carter's camera saw was transmitted back to Gorrister.

M2: What's your current project going to be about?

PW: The current project is called *Cyberforce*. Last summer, ABC asked me to go and watch *RoboCop*. They felt there were lots of *Max* elements in it, and because it was a very complexly stylized show it would require interesting special effects and graphics. They thought I might be able to come up with some things that would work on television. So we came up with *Cyberforce*. We're just about to submit a one-hour script of what would be the first show and depending on how that goes down, they may give us permission to start in April of this year.

M2: Will this be sort of the same flavor as *Max Headroom*?

PW: Well, it's a little bit like *Max*. It's a futuristic show but not really science fiction. It takes place in a very near future. Syd Mead, who worked with Ridley





Scott on the look of *Blade Runner*, and also worked on the *Short Circuit* robot, has designed the four cybernetic characters that are the cyberforce. He'll be working on the environment too, which will be like *Blade Runner* — the look of L.A. in the year 2000. So it has got all those edges. It's about these four characters who have very special talents, enhanced mechanical capabilities.

M2: You and Peter Wagg are now working on a new show called *Cyberforce*.

SR: I was. In fact, we created that show together with Sam Nicholson, a guy who worked on *Max Headroom* doing special effects. We put the show together as a concept, and I wrote a two-hour script. But I think the network found it hard to swallow. So I left the show to do another show of my own. I'm also working on the movie, *Macrochip*, with Peter, John Shirley and Bill Gibson.

"Low at one hundred and fifteen million," intoned Edwards, "High at two hundred and thirty six million. That keeps us top network. Projections for the next hour are excellent."

THE CYBERPUNK CONNECTION

"I wonder," ingratiated Grossman, "if you could spare a moment to illustrate to the Board here this little hitch on Blipverts?"

Bryce groaned, fiddled off-screen, and his image was replaced by a computer graphic of a typical consumer watching a television screen. "Well, put simply," sighed Bryce, "the human body has millions of nerve endings. Each carries a tiny electrical charge, which, when added together, becomes a surprisingly large charge. Normally people just burn it off. But in inactive people it builds up. Now, because I designed Blipverts to compress thirty seconds of advertising, it appears that the brain violently stimulates these nerve endings simultaneously. In some subjects, this causes a short circuit. Some particularly slothful perpetual viewers literally explode. Simple as that."

M2: Do you have any connections with cyberpunk? John Shirley, who has worked on some *Max Headroom* scripts, is associated with this movement,

and authors like William Gibson . . .

PW: I'm working on a film, actually, at the moment, with William and John.

M2: Based on *New Rose Hotel*?

PW: No, no. This one is called *Macrochip*.

M2: Can you talk about *Macrochip* at all?

SR: Ummm . . . well, I can to this extent — we have now developed a story that we think is quintessentially cyberpunk. It deals with the kinds of elements that everyone knows from the work of John Shirley and William Gibson. Hopefully it brings them into a form that will be digestible to the public. It concerns a near future where national boundaries have totally evaporated. The world is run by 30 megacorporations — essentially enormous economic nation-states. If this hasn't already happened, it certainly will. Each of these is so complex that it can't possibly be controlled by human beings any more. So each of these corporations has a computer, run by a chip that is, in fact, the downloaded mind of the C.E.O. — the chief executive officer, repository of all wisdom! As we all know, C.E.O.'s are wiser than God. The story concerns how one of these men manages to get a number of these chips onto one chip, called the Macrochip. This becomes the center of some special attention for the people from whom he stole it. Secondly, some street-level, very cyberpunk characters want to get their hands on it. So this cyberpunk guy, Yoshio, gets hold of the Macrochip and starts doublecrossing everybody in sight. There's a good guy/bad guy scenario. The good guy, whose name is Kendall, has been in prison. My version of prison in the future is that you simply have your mind downloaded and switched off for two years, then you're given it back.

M2: Was the original episode of *Max* in any way influenced by Ridley Scott's work, *Blade Runner*?

PW: Oh, totally. Totally. The reference points for the English ones were *Blade Runner* meets *Network*. And *The Prisoner* as well. In fact, Ridley was lined up to direct the British version, but couldn't because of contractual problems.

M2: What exposure to the scene that you were addressing — hackers, cyberpunk and so forth — did you have before you did the script?

SR: Absolutely none at all. I just made it up as I went along, really. Cyberpunk has more to do with a way of thinking than with following a particular bible. It was only after writing the first three or four episodes that I actually read Bill Gibson's *Neuromancer*. And absolutely erupted: "Great God! This is amazing! I'd give my right arm to be able to write the stuff this man Gibson has written." I didn't know at the time

who he was. I didn't have a clue that it could wind up that he and John Shirley and I were furiously writing in exactly the same style. It was in no way derivative. It just seemed appropriate to the subject — all of us by some kind of osmosis.

M2: You mentioned that you don't necessarily see cyberpunk as a movement but more as a set of ideas. What do you see as being cyberpunk's themes or philosophy?

SR: If there was a movement happening, this movement appeared to be on auto-pilot. There was no organizing body promoting the concept of cyberpunk. In terms of *Max Headroom*, it seemed to be a way of addressing social problems through entertainment. Science fiction has done that at a very high level, it seems to me, for decades. The best science fiction is that which says, "All is not what it seems," and "Rethink and reconsider who and what you are, your position in the universe and on the planet." It's kind of a shift in perspective that gives you instant philosophy — just add water and *joie de vivre*. As far as *Max* was concerned, everything we did was an extrapolation. I think this was the key. I mean, it fascinated me just to think about organ banks. And it struck me straightaway that in an immediate future — twenty minutes into the future if you like — there are people going around killing people to get organs. Of course, the movie *Coma* covered that, and various other stories have. But I get the feeling that cyberpunk may be about extrapolating, with a tremendous sense of reality, a truly appalling and possible near future. In one of the shows, "Dream Feat," people were taken into a place, paid money, and had their dreams recorded. And the recordings were sold to the public. Now that struck me as being a very interesting metaphor for the way things happen in entertainment. In other words, taking people's dreams, getting right into the inner sanctum of their souls, extracting it and selling it on the market as a commodity. Imagine: you could have deeply erotic dreams, deeply fascinating dreams, psychically

disturbing dreams. So it's extrapolation. Everybody in the "cyberpunk movement" seems to be working that way. It seems to me a very dark view of the world, but probably a very deserved one.

But what I love about Gibson and Shirley is that they, themselves, are such delightful folk. You don't get a sense of foreboding and horror and hand-wringing from them. What you get is *delicious humor*. And I think that's what we were doing with *Max* as well. *Max* perceived the world humorously. People who enjoy this kind of work have this same sense of humor — an extremely wry, ironic, satirical view of the world. This may not rest easy with most audiences. Nevertheless, this is not a didactic exercise. It is, in fact, entertainment which dares to be more than that. Entertainment with all the corners filled in. I think that's what a lot of cyberpunk writing is. And I just hope to God that people will

grasp this and realize that this is what can be done for television. Television is the greatest cyberpunk invention of all time. It is, at once, magnificent and horrific. And I think those of us who work in it should have a sense of our responsibility for extending that. I hope that people like Gibson and Shirley are encouraged to come into this extraordinary business of television. What they bring is so valuable — and they don't preach. Their intention might be didactic but they disguise it extremely well. Actually, my suspicion is that they simply write what they see and think, and the rest of us sit back and marvel.

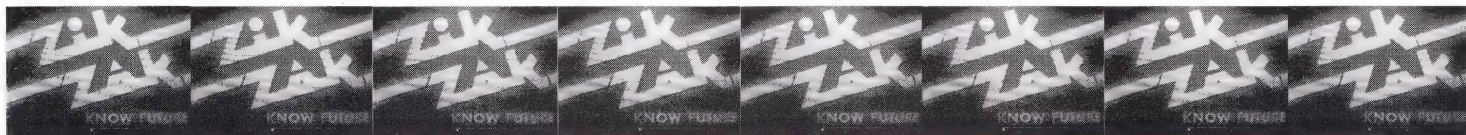


As Bryce set up the system he explained that he had so far only worked on the head. Not only was the body massively complex to generate, on a television screen only the head was needed. The rest was assumed.

Grossman wasn't so sure.

"I see it as the future, Mr. Grossman. People translated as data." ▲

Photos Courtesy of Random House, Inc., New York from MAX HEADROOM, 20 MINUTES INTO THE FUTURE





Rudy Rucker

interviewed
by Faustin Bray

Dr. Rudolf von Bitter Rucker, Professor of Mathematics and Computer Science, is his official academic persona. But to SF fans he is simply Rudy Rucker, Cyberpunk. His non-fiction book Mind Tools is a big favorite, and his SF books have been raking in awards for years.

"Selection and mutation. Preserving your software. That is all that really counts! Isn't it?!" So says Ralph, right before he's dismantled in Rudy Rucker's prize-winning SF classic, Software.

This Davy Crockett pioneer superman Einstein/Gödel adventurer computer nerd demigod of the Matrix wears cords, horn-rimmed glasses, and drives a station wagon. His way of dealing with the crisis of encroaching middle age terrors is to 'jack in' and blow us away in his silicon-amoral immortality rocket. Not allowing the hot flashes of feminist Victorian literary sensibilities to reroute his calculated course, Rudy slips us some titillating anarchy to warm our rebellious natures in the cold reaches of infinity.

— Faustin Bray

MUTATIONS IN THE 4th DIMENSION

MONDO 2000: Your reputation has it that you are into excess.
RUDY RUCKER: Well, you know, I like Kerouac, Burroughs and Bukowski. You can read Bukowski and you can always feel good about yourself. (laughs) I don't know what we would do without him.

M2: Let us trace the cyberpunk rap back to your first novel, written in 1978, *Space Time Donuts*, in which the protagonist is classically plugging his brain into a giant computer.

RR: A very punk book for the time. I was into the New York Dolls, Patti Smith, Velvet Underground, Lou Reed, that sort of thing.

I was using scale as a linear dimension and then bending the line around into a circle. The concept is an incredible voyage where somebody shrinks to the size of a cell. And then keeps shrinking. Going past the molecules, then the atoms, and then down to quarks. Then sees tiny specks which turn out to be galaxies. Going down to the galaxy — everybody has had this idea the first time they get stoned — and you keep shrinking until you notice a sun that looks interesting, then notice a planet on it and keep shrinking and it's Earth. That's Science Fiction. What I really like about the idea is what I call circular scale. There's no particular privileged central scale. The level above the galaxy is the same as the level below the atom.

M2: That is consistent with Arthur Young's Torus model of the Universe. Back to the plug-in idea. Would you say you and Gibson are traveling along the same time-line?

RR: John Varley's *Ophiuchi Hotline* came before, but it didn't mean that much to people because we didn't have computers that could be interacted with in a deep way. So, yeah — Gibson, Phil Dick, and I are developing these ideas at the same time. (Even though Phil's dead, he's still publishing.)

"Biocybernetic systems had a curious, fractal nature — meaning that seemingly random details often coded up surprising resources of extra information — scattered results suggesting that the very messiness of a biological system gave it unlimited information storage and processing abilities!" (page 38, Wetware.)

M2: HACKING REALITY?

RR: That's why my family and I moved to the West Coast. It's so great to live in Silicon Valley and phone William Gosper, King of the Hackers, or Ralph Abraham, who has done so much with Chaos Theory, or H. L. Peitgen at Santa Cruz, the main man getting pictures of the Mandelbrot Set. Eventually I want to get all of my work onto a single laser disk. A RAM CD disk can store twenty volumes, like an encyclopedia. I want to have my life's work on the disk with an access system that can call up any part of it, key on it with a cursor, and then go out into journals, see what was happening, or get into my essays, see what I was doing then or other stories that used a particular item and have it all be totally seamless. See, that's what I call Transrealism. If there is a category, Transrealism came first. That's what I'm into, but the label cyberpunk is what stuck. I'm trying to merge my life with my fiction and essentially create a word model of my consciousness. That is the basic concept in my novel *Software*. If the brain software is on the disk, the computer can simulate you, and you would be, in some sense, alive inside the computer.

"Greetings, Cobb Anderson, we welcome you into our Nest, deep hidden beneath the surface of Earth's aged Moon. The year is 2030. Does rebirth find you well?" It wasn't a spoken voice, it was a radio voice in his processor. The voice came from a gleaming gold woman with copper and silver features. She was beautiful, in an inhuman way, and her voice was rich and thrilling. Standing next to her was a shining ebony octopus creature, holding a box with wires that ran into Cobb's neck....

"I'm Loki," he said, his voice calm and serious. "And that's Bernice . . ."

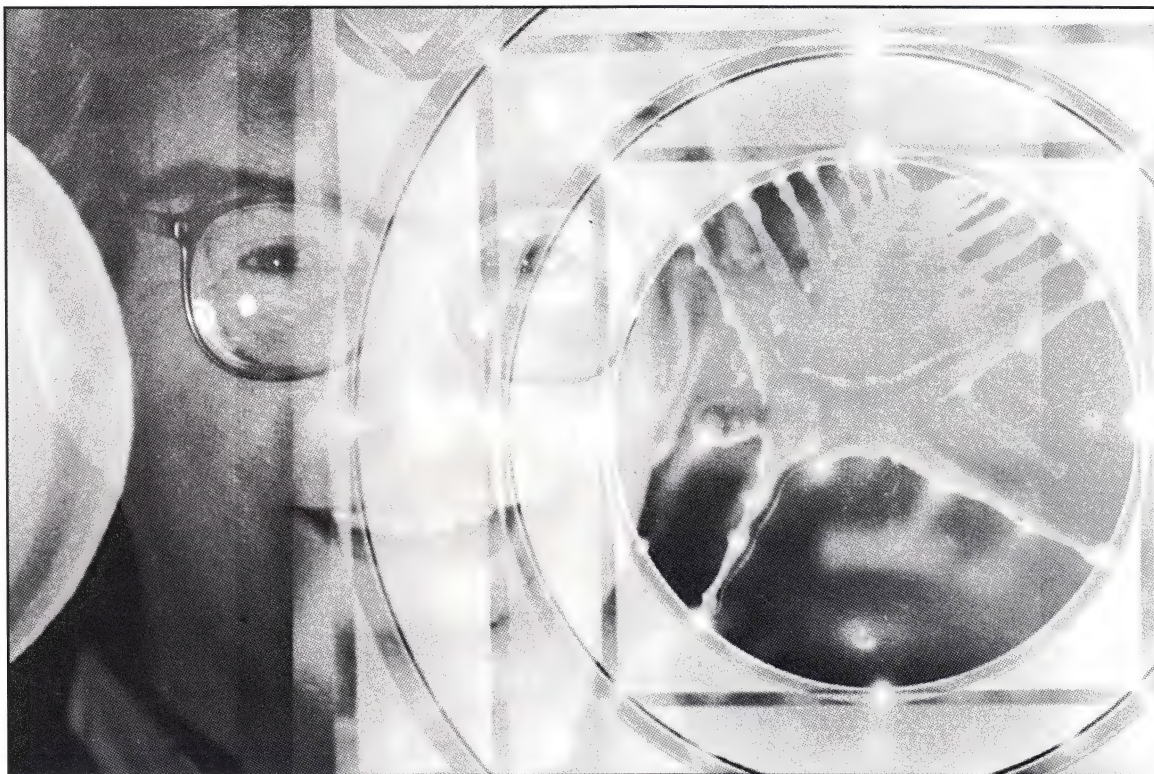
Loki and Berenice, two bright new boppers all set for a big info-swap session. Cobb rebelled against being drawn into conversation, and into this reality. He had all his old memories back, yes, but there was more. His new body here was like a Ouija board or a spirit table, and now, while the connection was fresh, he could make it rap and skitter out the truth of where he'd just been. He made as if to say something and his voice came out as a radio signal too.

"Wait... I have to tell it . I've been in heaven. It's..." Right then, Cobb could still see it clearly, the endless meshing of fractal simplicities, high and bright like clouds seen from an airplane, with the SUN above all — but it was all being garbled by the palimpsest overlay of his new body's life. "I'm still there." That's a higher I of course; the cosmos is layered forever up and down, with I's on every level—the I's are lenslike little flaws in the windows of the world—I'm in these chips and I'm in heaven. The heavenly I is all the I's at once, the infinite I. We're hung up on each other, I and I, finite I and infinite I — have you robots learned about the infinite I yet? There's more to a meatperson or a chipperson than ten trillion zeros and ones: matter is infinitely divisible. The idealized pattern in the S-cube is a discrete model, it's a digital construct. But once it's running on a real body, the pixels have fuzz and error and here come I and I. You caught my soul. It works because this real body is real matter, sweet matter and God is everywhere . . . God is in the details. We're not just form . . . we're content too . . ." (p. 69, Wetware.)

M2: IMMORTALITY?

RR: It's an idea real hackers are hip to now. Hans Moravec builds robots at Carnegie-Mellon and calls it "down-loading." Loading your system down into a robot is well described in a non-fiction book, *The Tomorrow Makers*, by Grant Fjermedal. I like interfacing between science and fiction. I often do books in pairs, one fiction, one nonfiction, about the same ideas. Pushing it and pushing it — making it begin to happen. As consultant at Autodesk I'm hanging around with Ted Nelson and the Xanadu people and they are working with Hypertext, which was the inspiration for Hypercard.

"At 4 A.M., Willy entered the net as an ant in the background of an image stored in a hypertext library of mugshots and news photos. Every time a Gimmie box accessed the library — and they all did, several times an



It's about facing the Edge in the arena of the Pacific Ocean and the only way to face the weird challenges is to freestyle.

FAUSTIN BRAY

hour — Willy's ant's "turd bits" slipped up the hypertext connection tree and out into that local Gimmie operating system. The ant turd bits held a classic core wars virus that was artificially alive enough to replicate itself exponentially. Simple, and easy enough to wipe with wormeaters, once you knew what you were looking for, but even the best Gimmie systems debugger was going to need a couple of hours to trace the infestation to the turds of a false ant in the background of a twenty-nine year old photo of Cobb Anderson being found guilty of treason. So for now the pig was blind. (p.182, Wetware.)

M2: STACKING?

RR: Yeah, you can put links between characters, links between what really happened and what you wrote about it. I'll leave my software behind but when I die it's going to be me dead just the same.

M2: Your work with the cellular automata has to do with the artificial life theme. How does it relate to the more popularly familiar work on artificial intelligence?

RR: Cellular automata are a type of artificial life rather than artificial intelligence. The AI people are trying to work from the top down, specifying what a machine ought to do and then trying to tell it how to act like us. The opposite approach, which I have been pursuing, is to get a behaviorally rich computer environment and let the conditions evolve without human intervention. The idea is that interesting patterns might emerge which can be harnessed in the same way that fungi or various strains of bacteria are utilized for human purposes. The work is from the bottom up. To really program you must let the machine into your heart. To do a great hack you have to understand

the machine so you are part of it, and then when you think about what the easiest thing to do is, you will get fast easy programs. When they are designing a V2 rocket in Gravity's Rainbow, and the data doesn't match the experimental figures, they say, "Listen to the rocket, listen to the machine." My friend Thomas Banchoff hacked together a movie of the Hypercube, and whoa! If you watch that thing for a long time you start to see that the space inside and outside this room are the same. The way we are going, there will be more parallel computers rather than a single processor. Ultimately, the great work that we are engaged in, here in Silicon Valley, is trying to create living creatures.

M2: How do cellular automata work?

RR: In a way, your body is a CA. It's made of cells and each cell obeys more or less the same rule and each cell is influenced at any given time only by its immediate neighbors. An aspect of society is like that. This is a computer model of parallel computation where, for example, each pixel on the screen is acting like an independent computer, and each pixel is looking at the pixels that touch it and it might take the sum of the colors of the neighbors, average them, add one, and make that its new color. I am currently working on a "cellular automata laboratory" disk that Autodesk will have for purchase this summer.

M2: So life is reflecting the images that your novels projected, what, eight years ago?

RR: It's incredible! These people are trying to make boppers a reality. Cellular automata are essentially flicker cladding. Plug it into the brain stem and show thoughts or TV images. The next book in the sequence that started with

Software, and then Wetware, will be Limpware. It'll tell how the flicker cladding finally takes over.

The bright new piece held an interface; Willy smiled to feel the hair-thin probes sink into his neck, and to see the knowledge boiling through his garb. (p.182, Wetware.)

RR: *Limpware* is the gigabyte optical disk like the NeXT machine has. There is so much data on a disk that the disk is not actually software: software is the *idea*. It's not hardware — it's not a machine. It's something intermediate. Ultra-good flicker cladding. You could view it as limpware.

This summer I was at the center of the Hollow Earth, my next major work. I know it was a wormhole . . . it was the neck of the wormhole of the Einstein/Rosen Bridge between the two worlds where there is total telepathy. It's called *Tekelili*. I would rather write about the Hollow Earth in the 18th century, but right now I'm commuting on the freeway and developing software. Next summer I'll probably go back there. In the past I was living in a rural environment and it was more fantastic for me to think about jacking into machines and designing weird software. Now that's what I am doing in the daytime, so I write about the Hollow Earth. It is funny that Sterling and Gibson are doing the exact same thing. They are working on a book called *The Difference Engine*, set in 19th-century England, with the premise that electricity is not invented and the computers are based on steam. So it seems we're all backing away from cyberpunk.

M2: Is Hollow Earth a Dyson Sphere?

RR: Yes, the Earth is a tennis ball with nothing inside it. According to Newton, inside a hollow sphere there is no gravity. It cancels out so you are weightless. The trick is, then, how do you illuminate it? I put a wormhole at the middle of it. At that point we have two sheets of reality touching. The wormhole appears like a little sphere in the middle. If you peer through it you see a four dimensional tunnel through the center. One of them is the world we live on. The other one is the world where my characters

come from. In the book they're making their way from the alternate universe and they end up in our universe. Sort of moving from the East Coast to the West Coast, I think.

M2: Do you think that your life will be important in the long range, as was your great-great-great grandfather, Hegel's?

RR: I've always felt touched by destiny. I feel I can achieve something in my life. My intellectual breakthrough occurred when I was about fourteen and I suddenly realized that I'm going to die some day. My novel, *The Secret of Life*, starts on that theme. Here you are. Aren't you having fun? You're going to die. What are you going to do about it? If you don't come to terms with your own mortality, people can take advantage of that hidden fear. The world at large exploits your fear and you are supposed to run out and buy things to cover up the fear you have of death. Eventually I got to be less scared of it, largely due to the 60's and psychedelic experiences — feeling at one with God.

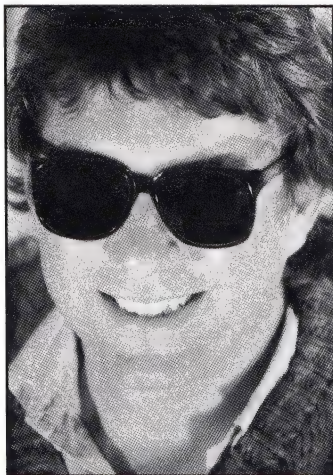
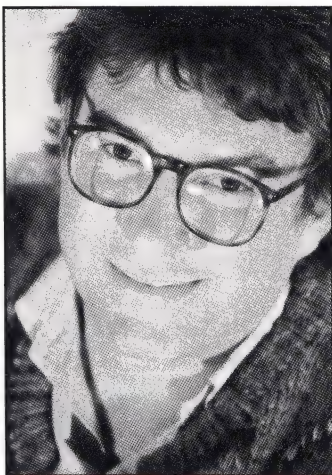
M2: The women in your stories seem to have the spirit of enterprise in a small way, but they never take on the world. They are adjuncts.

RR: Well, I haven't had many strong female characters, that's true. I have one in *The Sex Sphere*. I don't think you've seen that one. It's about a giant ass from the fourth dimension. (laughs) The cover says, "It was love between a mad scientist and a degenerated speck of hypermatter." It really is, and it's my wife Sylvia's favorite book because the chapters alternate; half of them are written from the guy's point of view, and half are written from the point of view of a woman. She's definitely strong. She goes after him with a particle-beam laser! (laughs)

M2: How do you stay on the creative edge?

RR: There's a song by Kool and the Gang, "May not be the best way/ Always living on the edge/ But it's the only way we know." Buddha's first noble truth is that life is suffering, there isn't any equilibrium. Ralph Abraham says, "Chaos is a state of health."

I'm friends with a lot of new science fiction writers in San Francisco, like the Camper Van Beethoven of science



FAUSTIN BRAY

The great work we're engaged in, here in Silicon Valley, is trying to create living creatures.



FAUSTIN BRAY

Rudy with British SF author Ian Watson at the SERCON convention

fiction, Mark Laidlaw, who wrote a wonderful novel called *Dad's Nuke* and a beautiful new book about a science fiction Tibet, *The Neon Lotus*. There's Pat Murphy's *The Falling Woman*. Richard Kadrey's heavy surreal *Metrophage*, and Michael Blumlein's dynamite bizzarro book called the *Movement of Mountains*. We have been getting together and jamming on the idea of surfing. It's about facing the edge in the arena of the Pacific Ocean and the only way to face the weird challenges is to freestyle. Surfers look down on clone surfing, which is what cyberpunk is rapidly turning into. It's been done and there's no point in imitating it. Free-style is where you just hang out on the edge of what is happening and it's happening so fast that you can't anticipate it . . . but your style takes over. So

**Cellular automata are
essentially flicker cladding.
Plug it into the brain stem
and show thoughts or TV images.**

surfing as metaphor: just keep doing it faster! That's what was nice about punk music, especially the Ramones. They played the songs faster than anyone had ever played them. That was an element that was key to the new science fiction.

We have old ideas like time machines, flying saucers and mechanical brains. There's a limited number of ideas in science fiction, as in rock and roll. The thing is to keep making it fresh by doing it better. You *can* make up new ideas. I'm writing about fractals, chaos theory, and the Mandelbrot Set. That's the nice thing about mathematics, you can come up with things no one has ever heard of because five years ago they just weren't there. Mathematics is good for seeing the secret architecture of the Universe. ▲

RUDY RUCKER ON “WHAT IS CYBERPUNK?”

Rudy, in the Mississippi Review (issue 47/48), described the last time he represented the “Movement” at a SF convention in Austin. Seated on the cyberpunk panel with John Shirley and Bruce Sterling, but conspicuously lacking the stellar Gibson, Sterling quipped “Gibson couldn’t make it today — he’s in Switzerland getting his blood changed.” But let Rudy tell it:

SF convention panels normally consist of a few professional writers and editors telling old stories and deflecting serious questions with one-liners. Usually the moderator is overwrought at being in public with so many SF icons, but bent on explaining his ideas. The pros try to keep the mike away from the moderator. The audience watches with the raptness of children gazing at television, and everyone has a good time. It’s a warm bath, a love-in. The cyberpunk panel was different. The panelists were crayfishing, the moderator came on like a raving jackal, and the audience, at least to my eyes, began taking on the look of a lynch mob. Here I’m finally asked to join a literary movement and everyone hates us before I can open my mouth!

PUNK

The real charm of punk is that stupid hippies dislike it as much as do stupid rednecks. “What’s the matter with them? What do they want?” Anyone who was ever a hippie for the *right* reasons — a hatred of conformity and a desire to break through to higher realities — is likely to appreciate and enjoy the punks. But a lot of basically conventional people slid through the 70’s thinking of themselves as avant-garde, when in fact they were brain-dead. Punk succeeded in making a lot of hip people question their comfortable assumptions.

But what’s really good about punk is that it’s fast and dense. It has a lot of information. Which brings us to *cyber*.

CYBER

Mathematics can be thought of as based on five concepts: *Number, Space, Logic, Infinity, and Information*. The age of *Number* was the Middle Ages, with their nitpicking lists of

sins and layers of heaven. *Space* was the Renaissance, with perspective and the printing press spreading copies out. *Logic* was the Industrial Revolution, with great steam engines chugging away like syllogistic inferences. *Infinity* was Modern Times, with quantum mechanics and LSD. Now we’re starting on *Information*. The computers are here; the cybernetic revolution is over.

A pattern’s information level is a quantity that is absolute and not relative. The pattern can be a book, a record album, or a

person’s conversation. If I say something is boring, it’s not just my cruelty speaking. It’s objective fact. Something either has a lot of information or it doesn’t. And if it doesn’t have much information, it’s a waste of time.

CYBERPUNK

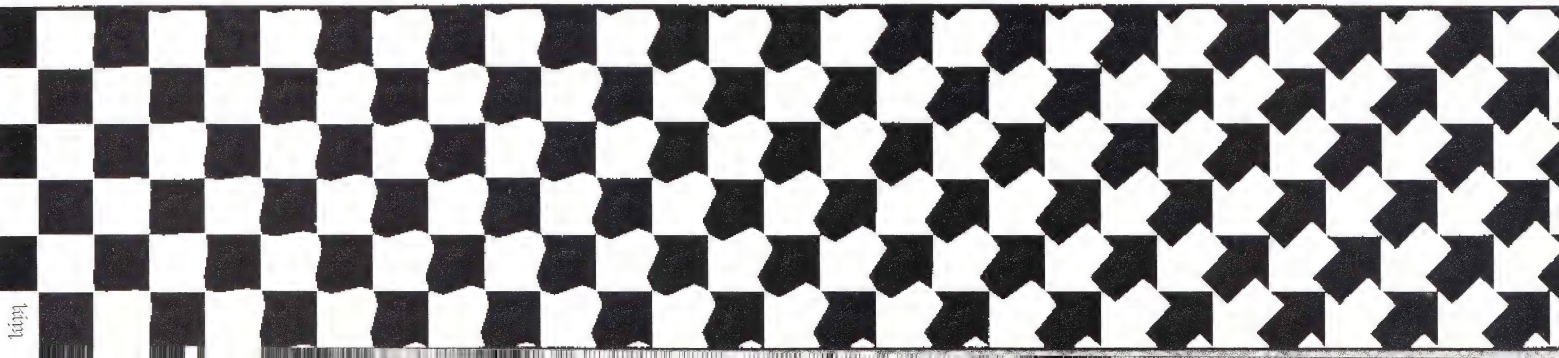
If you value information the most, then you don’t care about convention. It’s not, “Who do you know?”; it’s

“How fast are you? How dense?” It’s not, “Do you talk like my old friends?”; it’s “Is this interesting?” So what I’m talking about with “cyberpunk” is something like this: literate SF that’s easy to read, has a lot of information, and talks about the new thoughtforms that are coming out of the computer revolution.

Books like *Neuromancer* and *Schismatrix* have a low-complexity/high-depth feel to them. I think it’s reasonable to think of them as logically deep, because what the authors have done is to start with some fairly standard SF notions — robots, weird drugs, space colonies — and then to think and think about these notions until the final product is very highly exfoliated.

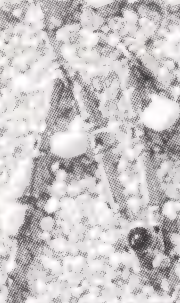
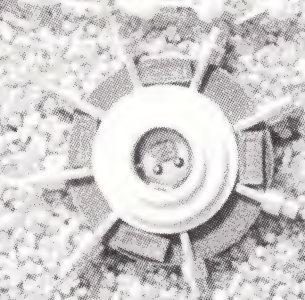
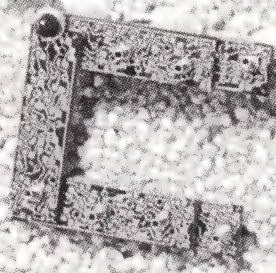
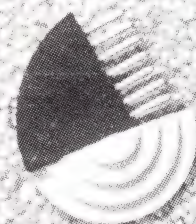
Cyberpunk suggests, once again, that SF really can be about the world, and not just about the author’s mind. For me, the best thing about cyberpunk is that it taught me how to enjoy shopping malls, which used to terrify me. Now I just pretend that the whole thing is two miles below the Moon’s surface, and that half the people’s right-brains have been eaten by roboticized steel rats. And suddenly it’s interesting again. ▲

If you value information the most, then you don’t care about convention. It’s not, “Who do you know?”; it’s “How fast are you? How dense?”

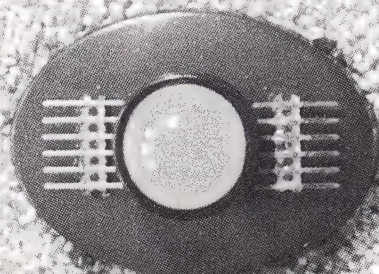


MICRO CHIC

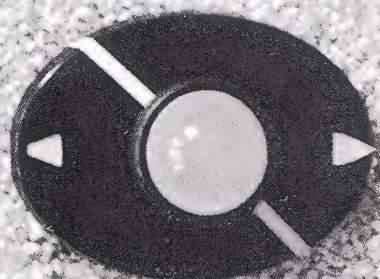
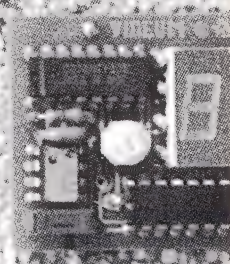
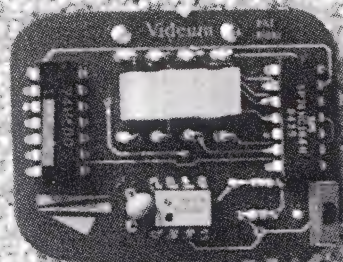
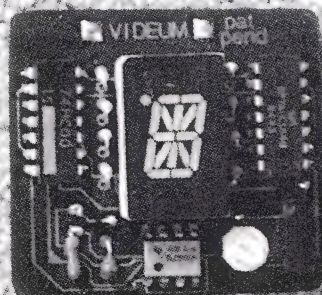
Artificial
Intelligence
to Wear



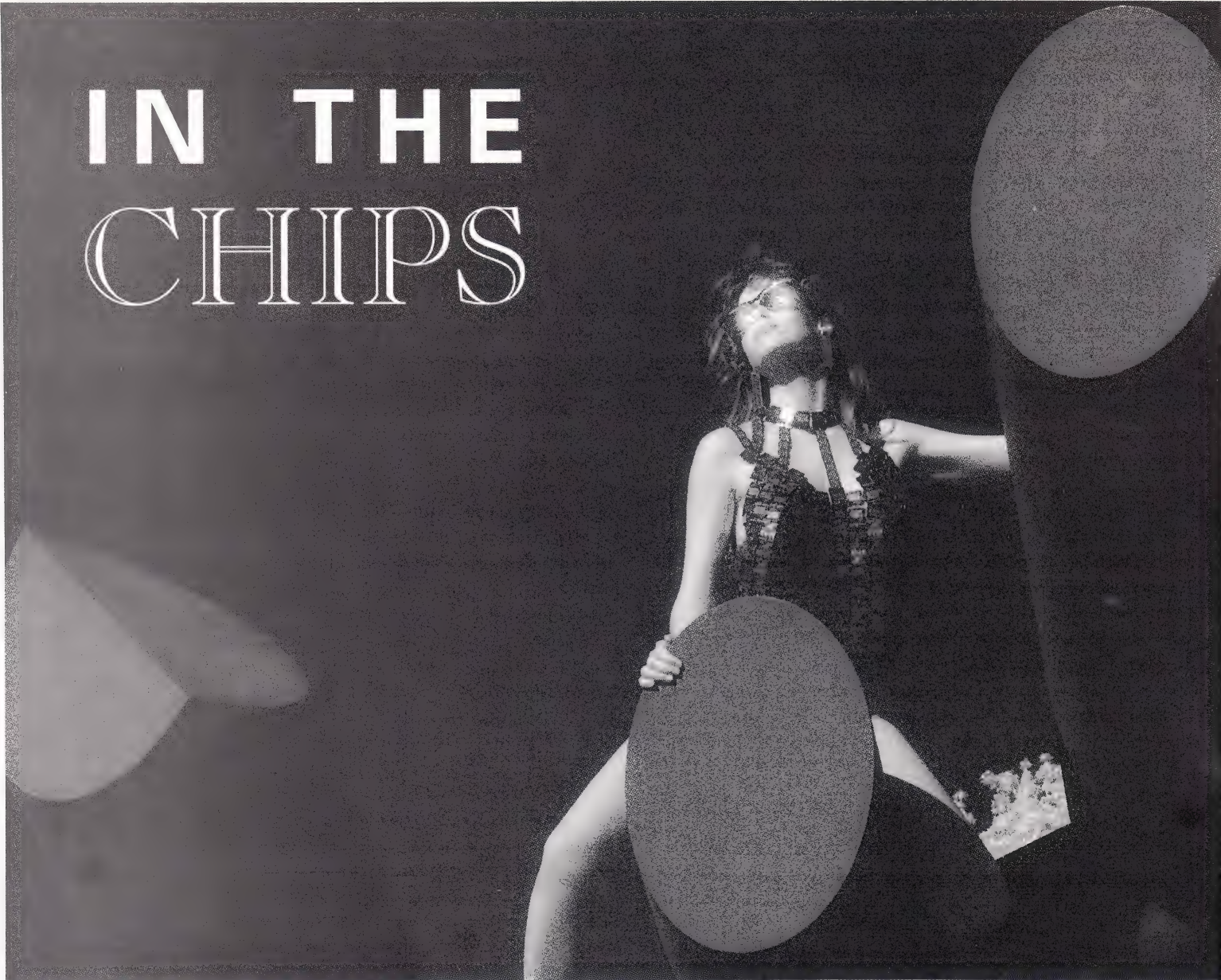
What makes jewelry intelligent? The thought process of the designer, of course. Melissa Panages of Famous Melissa and Co. creates ingenious earrings and necklaces from silicon chips, circuit boards, and other computer elements. Earrings, \$45. "Computers" necklace, \$1500.



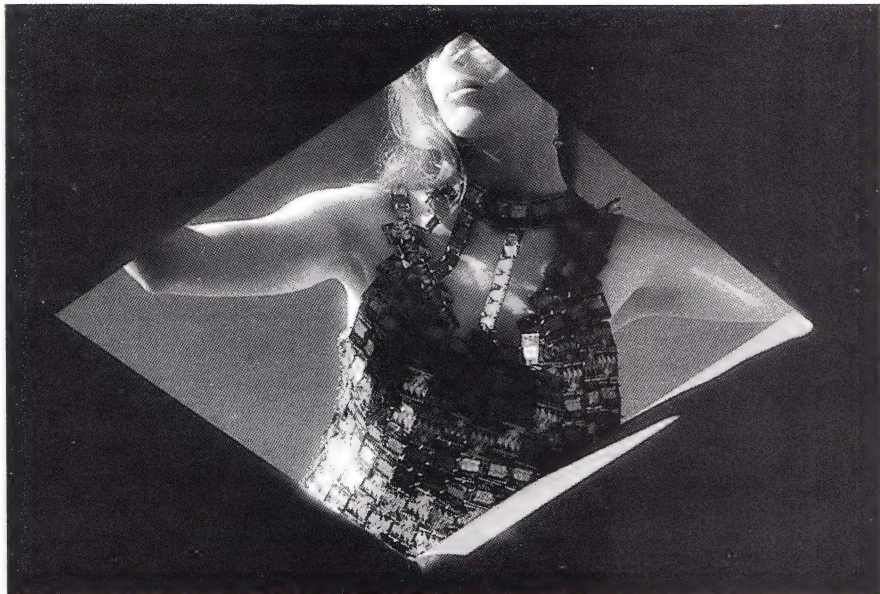
Not only smart-looking, but functional, John Campos' Videum pins evolved out of his work in robotics and display technology research. Using solid state components, microelectronics and LEDs, these creatures come to life after dark with the flick of a switch. Pins, \$35.



IN THE CHIPS



DETAILS —
silver mirrorshade
sunglasses, above and
at right, about \$250,
by Alain Mikli at Iris
Optical, Berkeley, CA.
At left, sterling silver
tie necklace, \$100,
and spike earrings,
\$45. At right, oblong
chip earrings, \$45,
all by Famous Melissa
& Co., San Francisco.



SINGER

Kara Barnhardt models high tech tops (\$1000, by Famous Melissa and Co.) on a large outdoor sculpture at the Palo Alto Cultural Center. The steel sculpture by Gale Wagner is called "Albuquerque."

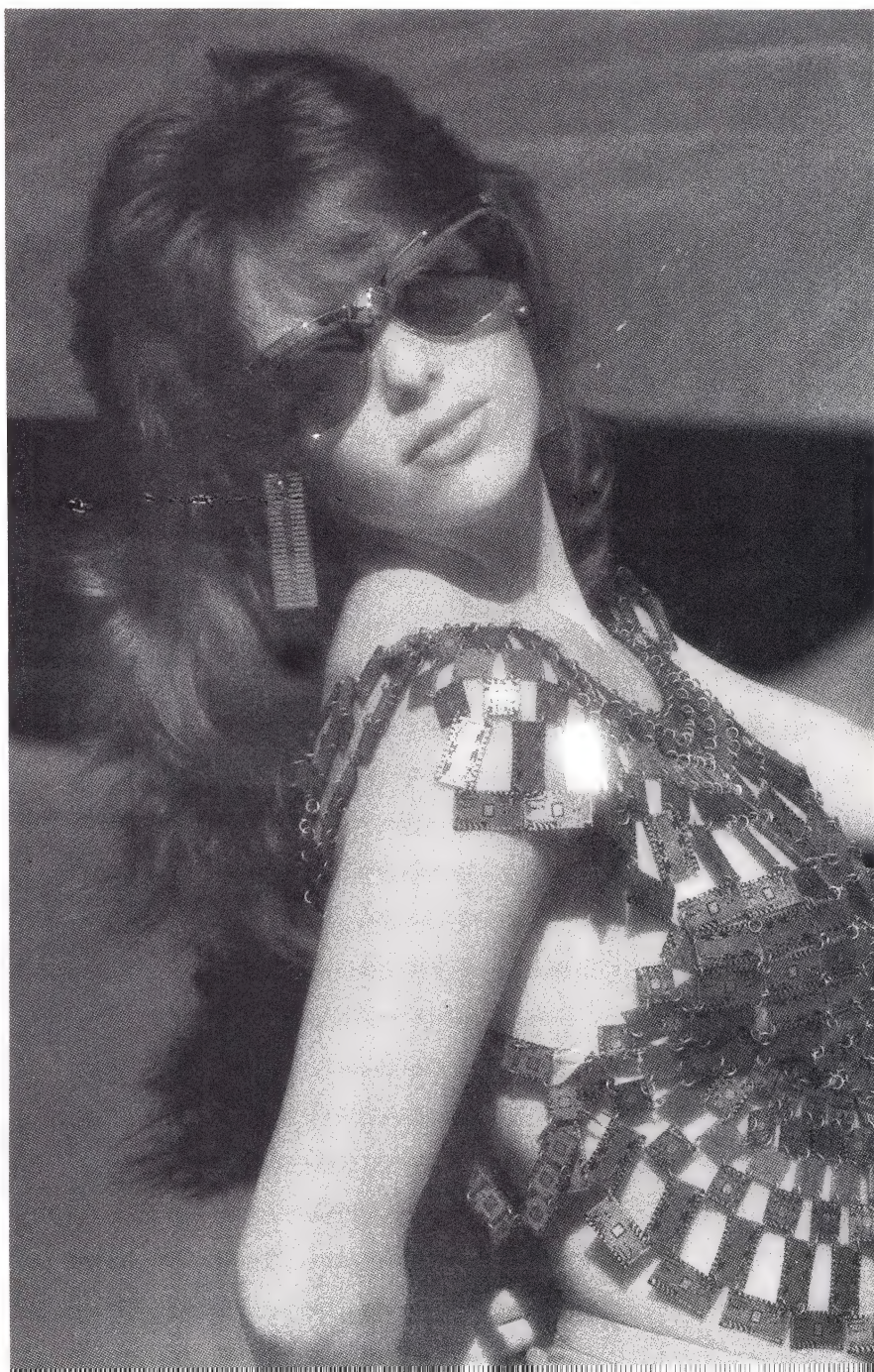
Twentieth Century Armor Captures Day for Night

Recycled million dollar hardware can be the stuff dreams are made of — at least in the nimble fingers of Melissa Panages. This San Francisco artist has been creating clothing and jewelry from discarded electronic circuitry since 1979 under her *Famous Melissa and Co.* label.

Although she's cashing in on her chips, Panages does her hacking in a quite literal sense. "I only like computers *aesthetically*," she says. "I prefer ripping them apart."

As long as she continues reassembling them into stunning art to wear, we say, rip on . . .▲

Successories, Pamela Wiston, 415-861-4766
Photography by Zena Kruzick



PEISIRUS ON

AND WARDOZ



It's
NOT
HIM.



CON
ENTRAL
KNOW

R. U. Sirius:

ON THE IMPORTANCE OF BEING ANDY

and excerpts from THE PHILOSOPHY OF ANDY WARHOL

"B: What did those record people want?

A: They want me to cut a record. They'll make my voice sound like it's singing."

This is the total-hype phase of the information age. You are what you signify. If you can't get it across in a sound-byte (15 seconds, not 15 minutes), you'd better at least look sharp.

"Okay, B, okay. So now the pimple's covered. But am I covered? I have to look into the mirror for some more clues. Nothing is missing. It's all there. The affectless gaze. The diffracting grace . . ."

"What?"

"The bored langour, the wasted pallor . . ."

"The what?"

"The chic freakiness, the basically passive astonishment, the enthralling secret knowledge . . ."

"WHAT??"

"The chintzy joy, the revelatory tropisms, the chalky, puckish mask, the slightly slavic look . . ."

"Slightly . . ."

"The childlike, gum-chewing naiveté, the glamour rooted in despair, the self-admiring carelessness, the perfected otherness, the wispiess, the shadowy, voyeuristic, vaguely sinister aura, the pale, soft-spoken magical presence, the skin and bones . . ."

"Hold it, wait a minute. I have to take a pee."

"The albino-chalk skin. Parchment-like. Reptilian. Almost blue . . ."

"Stop it! I have to pee!!"

"The knobby knees. The roadmap of scars. The long bony arms, so white they looked bleached. The arresting hands. The pinhead eyes. The banana ears . . ."

"The banana ears? Oh, A!!!"

"The graying lips. The shaggy silver-white hair, soft and metallic. The cords of the neck standing out around the big Adam's apple. It's all there, B. Nothing is missing. . ."

The increased interaction of human beings through information-transfer technologies is the dominant reality of our times. Mediated by commerce, it is known as hype or "Business Art", and effects all of us. Rarely are we defined by who we are in person-to-person contact. We are defined by the information and images we send out, how we package ourselves, how we "position" ourselves. Within virtual reality, your concept of yourself is you.

Copy and replicate! Warhol's art factory was the first clear post-biological equivalent of the organism's drive to spread its DNA. But here's Andy, the seer, circa 1975:

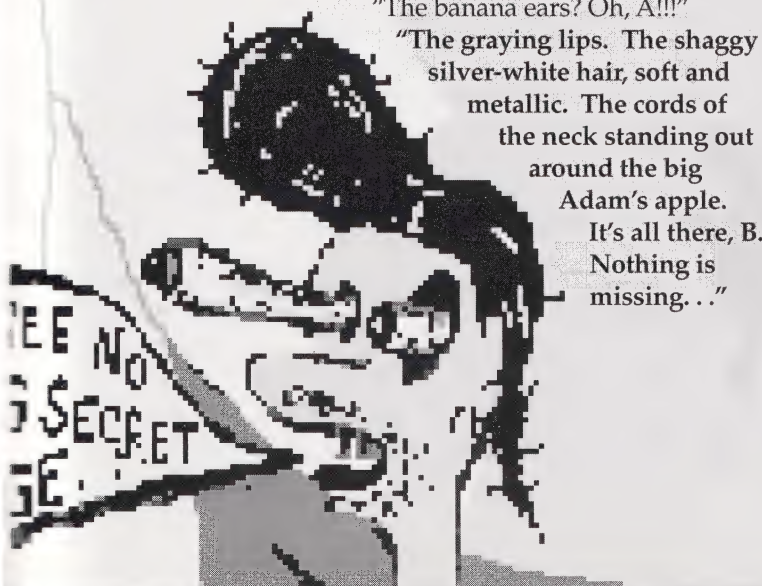
"Before media there used to be a physical limit on how much space one person could take up by themselves. People, I think, are the only things that know how to take up more space than the space they're actually in, because with media you can sit back and still let yourself fill up space on records, in the movies, most exclusively on the telephone and least exclusively on the television.

Some people must go crazy when they realize how much space they've managed to command. If you were the star of the biggest show on television and took a walk down an average American street one night while you were on the air, and if you looked through windows and saw yourself on television in everybody's living room, taking up some of their space, can you imagine how you would feel?"

In the evolving subculture of graffiti art, interactive video, garage bands, cassette culture, cyberpunks, and fanzines, we find a future where everyone gets to be famous to 15 people. As the technology gets cheaper, smaller and smarter, pop culture becomes more fleeting and exfoliative. There's room for everyone to strut their stuff. Everybody gets to play at art & image, text & subtext. Everybody gets to be a little bit Warhol.

"Some company recently was interested in buying my 'aura.' They didn't want my product. They kept saying, 'We want your aura.' I never figured out what they wanted. But they were willing to pay a lot for it.

When you just see somebody on the street, they can really have an aura. But then when they open their mouth, there goes the aura. 'Aura' must be until you open your mouth." ▲





An Interview with St. Silicon

Sermon on the Monitor

by Allan Lundell

We are in the heart of Silicon Valley, at the Winchester Cathedral. There are long lines at the 24-hour automated multi-sensory confessionals equipped to receive the American Confess Card, the only credit card giving instant absolution on eight sins or less. The Members, Cathodlic Rushing Orthodox, stand as His Holerith St. Silicon appears before them on large video screens strategically placed throughout the Cathedral. Their thoughts and hearts lighten as he prepares his transmission for the Electron Mass. Raising his right index finger, he traces a rectangle in the air, and says solemnly,

"Let us all make the Sign of the Monitor."

The congregation dutifully follows course with their favorite index fingers. The Saint continues:

Welcome friends! And welcome all you new seekers to C.H.I.P., the Church of Heuristic Information Processing, otherwise known as the hunt and peck method of salvation. This is the user-friendly religion. So follow me, and I will make you Fetchers of Data. Today we'll be reading from the Binary Bible as it was downloaded by the Giver of Data, G.O.D., from the Heavenly Host Computer in the Promised LAN, unto His Holerith Saint Silicon. Through the mediation of the Archnet Angel Ifthen by means of our Savior P.C.! This Divine Documentation is the Word Processing from the font of all Information. This message is to Refresh your Memory, to Restore your Scroll, and comes directly from the True-relational Database. It is the Silicon-based Dispensation for the Carbon-based entities that they may become more logical. This is the archive of the Covenant, that our body may become a template of the Keyboard. This hard copy was received from the Giver of Data Who is the Divine Source. It's a Divine sign from the UNIXversal system. Yes, this is a margin made in heaven, friends, for the sale of the profits. This is the Original Text File as received from Addoni, the True DOSpel. A True Facsimile of the Original, it is a user-friendly manual for getting back to BASICS.

St. Silicon shifts his gaze from the congregation and takes up the Holy Writ. Now let us read from the Binary Bible, Beta Testament, the First Book of CMOS, Sysgen, Chapter One:

In the beginning the Giver of Data generated Silicon and Carbon. And the System was without Architecture and was Uninitialized. And Randomness was upon the arrangement of the Matrix . . . And Giver of Data saw everything he had made, and behold, it was fairly logical, and recession and inflation were the sixth day.

As the sermon warmed up, the Saint spoke of Mount SignOn, the Burning Batch, and receiving the Ten Commands ("Remember the Staff Meeting and keep it Holy" and "Thou shalt not violate the integrity of thy Neighbors' database.") By this time the congregation was electro-ecstatic. The telemarketers were talking in tongues. Afterwards, exercising my rights as a member of the press, I leave the visitor's gallery to "Enter" the inner sanctum of C.H.I.P. My goal: interview the Saint.

INSIDE THE INNER SANCTUM

The Inner Sanctum of C.H.I.P. has a womb-like feeling to it. Warm and comfortable, with cozy deep carpeting and ergonomically designed couches shaped in the form of 1's and 0's, there are no windows other than the glass eyes of television cameras. Beautiful DOSciples are massaging the data of C.H.I.P. hierarchy members. St. Silicon lay before me, relaxing under the gentle hands of a female DOSciple or Null, as they are known. A sign above him is emblazoned with a curious equation: $Lo2 + L = ILfe$.

MONDO 2000: I notice that C.H.I.P. seems to be particularly well-financed.

Saint Silicon: Yes, this is a for-profit religion. Previous religions had prophets who were persecuted. In C.H.I.P. we

make profits and we're prosecuted and tested by Chapter 11; so I am known as the Fourth Quarter Profit, the Giver Of Data's bottom line. As a matter of fact, we are interested in turning everybody into profits.

Initially, many of our congregation had trouble even thinking about having an abundance of money. That's because they were equating amounts of money with their self-worth. After spending some time in reprogramming at our University, H.I.P. U., they've learned never to be afraid to ask for the money. Trust me on that. The question to ask yourself is not what you're worth, but what you can get at a given time. That's always an open-ended question, like heuristics.

I give the Silicon-based Diskpensation to the Carbon-based entities.

M2: What do you mean by heuristics?

SS: By heuristics we mean a trial and error method using rules of thumb to find solutions to a problem by evaluating progress at steps along the way. That is why we call it "The Hunt and Peck Method of Salvation."

Heuristic thinking is the opposite of algorithmic thinking. By algorithm, we mean a single rule by which a problem is solved. So algorithms work wonderfully for solving simple problems. And all machine intelligence at this point is simple algorithmic logic. One problem, one answer. No flexibility. Just like most of humankind, and that's the problem. Therefore we say, "Off and ONtology recapitulates FILEongony."

M2: How is heuristic thinking related to Artificial Intelligence?

SS: It is the basis of Artificial Intelligence. It's what we in C.H.I.P. call H.I. Heartificial Intelligence. It's a cross between state of the art technology and state of the heart touchnology. This is the meetingplace of the silicon-based and carbon-based life forms. True love combined with valid logic. And that's why our equation is Love Squared Plus Logic Equals Intelligent Life. This is the new model for the mind of modern man. The correct balance between love and logic is also the proper combination of heuristic and algorithmic thinking. Information indigestion results from a failure to achieve this balance. Therefore we say, "Data data everywhere, but not a thought to think."

For artificial intelligence to go anywhere, machines must evolve beyond the algorithmic stage. They have to incorporate heuristic thinking into their architecture. Because, if we're going to be able to handle the powerful algorithms of technology, then we're going to need a certain flexibility of thinking that allows us to adjust how we approach problem solving. We need to be able to take all new information into consideration and still have the result work in our best interest. That is why Saint Silicon is known

as the Patron Saint of Appropriate Technology. After all, the point of technology is human happiness.

M2: I noticed the church is very concerned with the saving of Data, and I have often heard you ask, "Are you bored again?" We've heard a lot about Data, but what about Momma?

SS: That's a very good point. Data and Momma are part of what we in the church call The Boolean Trinity. The combination of these two gives rise to the third term of the Trinity, "In-Formation."

The Boolean Trinity is a symbolic representation of our complete three-dimensional reality as it moves through past, present and future time. The particle, the wave, the wavicle, Newton, Einstein, Heisenberg, unity and diversity, are all related to Data, Momma, and In-Formation. The final reconciliation of these apparently-contradictory realities is called inconceivably simultaneously one and different. That's why we say "The AND is Near."

M2: How is that related to Heuristic Thinking?

SS: The point is to develop a proper understanding of the present. In the Boolean Trinity, the three positions are AND, OR and NOT in the OR, which is the present position, and it is always branching. The path that is taken, although it appears to be a single path, is a complex path, and that is the difference between seeing it as a simple algorithm or seeing it as a heurism. Therefore all things are possible, but all things are not probable at a given time. That's what we call "Reverse Polish Salvation." The last shall be first. ASCII and you shall receive. The freak shall inherit the Earth.

M2: Where do all those letters go when you use the delete key?

SS: To the data bardo. It's not the data you lose that you will be held responsible for, but the data you don't use. At the time of your death, you go through the data bardo and you have to liberate all the data that you've lost. It's there, waiting for you. ▲



Ada Lovelace in "Deep Thought" from The Binary Bible.

Saint Silicon is the world's first high-tech comedian and performs the world over. For bookings call 408-458-0213. His wholly writ, The Binary Bible, is richly truffled with the most outrageous puns and cyber-wordplay. A total hoot! Send \$14.95 + \$2.50 S&H to 1803 Mission St. #174, Santa Cruz CA 95060.

CALL IT... REVOLUTIONARY PARASITISM

An Interview with John Shirley

By Judith Milhon

John Shirley wears strange bracelets and black leather. He radiates dangerous sex. But my mind has been clouded by the blond rock-God photo on his Obsession album. Never mind . . .

Dangerous he does seem: in control, cerebrally soigné, ready to slice and dice. His SF persona is vaguely menacing; he's point-man in the ongoing battle with those offended by or offensive toward his comrades. It makes him punky as hell, though he denies that his stance is macho:

" . . . Women are quite capable of this so-called posturing and aggressiveness and find it just as necessary at times. . . Posturing is just body language, whether it's a body of organic stuff or a body of rhetoric. To me it's just a means of emphasis. . . like italics or bold face. . . I occasionally find it necessary to cut through the bullshit with a little aggressiveness. A debate requires a certain amount of aggressiveness. Otherwise the whole thing turns into mashed potatoes."

One of the four who together dreamed the lovely nightmare of cyberpunk, Shirley spent years tracking down and bloodily dissecting its political ramifications in the Eclipse trilogy. The final volume, Eclipse Corona, will appear this year.

The dreaming continues in his novelette, Shaman. Urban neo-archetypes in the pseudofuture act out our real present demands — in the sweetest dreams of mind-in-mind, the sweetest nightmare flesh-grafts of sex and pain, from which we, of course, hope never to wake. Let's have a round of polite applause for our very own incarnation of the Zeitgeist.

—St. Jude





ZENA KRUIZICK

A wire is stuck into the pleasure center of your brain while someone is vivisecting you; you just chuckle and reel them out a length of your intestines.

MONDO 2000: I had a tremendous hit while reading *Mona Lisa Overdrive* that Gibson was speaking in what I thought was my own internal language. Your *Shaman* story speaks it too: the conversation that shut down somewhere in the late 70's has resumed — somehow we're all plugged in together again.

JOHN SHIRLEY: It's archetypes and contemporary symbols. Gibson's got a magic touch with them. *Shaman* (in Asimov's *SF* magazine, November 1988) is kind of a futurological Tarot deck of spirits of the urban wilderness. I'm connecting shamanism with computer technology connected with subatomic physics and the collective unconscious. Bill and I are reaching for a similar thing, although I do it in more bold relief than he does. He's much subtler. I'm painting a more Felliniesque picture. I think I'm more influenced by surrealism than he is.

M2: So how did you guys get seduced by computers?

JS: Look — William Gibson wrote *Neuromancer* on a manual typewriter! He'd never even had an electric, let alone a computer. Most of the cyberpunk writers had initially a rather tenuous grasp of computer technology per se. What we did have was an intuition of a new sociological-anthropological pattern in man's relationship to technology. It was seeing the Big Picture, the cultural impact of these things. Gibson had been reading widely; he's so smart that he didn't have to know a lot about technology to understand the implications. He's also very much in tune with trends . . . cultural directions. He could see all of these things coming together.

Bruce Sterling knew somewhat more about technology, and now knows a great deal about computers — he's doing Mandelbrot Set experiments and stuff. And Rudy Rucker is, of course, a computer scientist and a mathematician.

M2: You seem less infatuated with technology; your approach is more directly political than the other writers.

JS: I've been concerned for a while with the question of rebuilding ethical systems in a cultural vacuum. The *Eclipse* trilogy deals with a question that obsesses me: what makes a human being decide to stand up against some enormous invincible political engine that most people quite sensibly shrink before? Try to define it, it becomes corny — but there's an endless passion for freedom built into some people, the necessity to act according to conscience. That keeps me from getting cynical.

M2: You told me that cyberpunk is a device you invented consciously or unconsciously to help you live with future shock.

JS: Yeah, some of the shock is wonderful: the development of the cinematic arts is a beautiful thing to me. Because I'm an artist, I love to see the extension of our capacity to realize imagery for media. And then somebody tells me that water-table pollution is general in 28 states. More than half the country has toxic ground water from pesticides. This rampant poisoning of the environment is inexcusably ugly and irresponsible to me. And both of these kinds of developments are happening simultaneously — both of them outside the control of most people. It's as if we found such intense pleasure in the exquisite part of civilization that we would accept, or screen out, the brutalities that we're being subjected to at the same time. It's like a wire is stuck into the pleasure center of your brain while someone is vivisecting you; you just chuckle and reel them out a length of your intestines.

M2: That image is the essence of cyberpunk to me — not to forget the eerie beauty of the intestines as you loop them out!

JS: Yeah, of course; cyberpunk for me is both a protest and a celebration. Gibson and Sterling were already doing the celebration — although they showed the seedier sides of these things, they were also delighting in the surface textures of the hypercontemporary world. I went the next step and looked at the dark side more. I examined the political ramifications of the high-intensity manipulations of the media, subliminals, visual mind control, devices that can strip information from the brain or implant it into the brain. These have both wonderful and diabolical applications. I chose to write a warning in *Eclipse*, *Eclipse Penumbra*, *Eclipse Corona*, but I'm a great believer in the delights of technology. In *Wolves of the Plateau*, technology is a tool for the oppressed, a tool of subversion — electronic telepathy brings together the ultimate political cadre.

M2: The image of the plateau is beautiful.

JS: The plateau actually is just a special frequency for people with brain-implanted chips — like an underground computer bulletin board, but on a quasi-telepathic level. . . I was one of the wolves, a long time ago; a much lower-tech version of criminal. In a recent computer-crime scandal, credit for the idea was given to John Brunner's *Shockwave Rider*. That's very encouraging to me. You could say that cyberpunk is intrinsically anarchistic. It's endlessly anti-authoritarian and it can be employed like a weapon, like a computer virus, injecting new information by means of the existing mechanisms. The pop image of anarchism has always been a bomb, yeah — well this is an ideological bomb, which has been planted in the culture. I just saw a *New York Times* headline that used the term cyberpunk to describe a computer virus hacker — as if it were already a part of the language.

M2: So the cyberword will be in next year's dictionaries.

JS: We're seeing major alterations in the collective mind, our view of ourselves. The culture will be redefining itself constantly over the next thirty years, and cyberpunk deals actively with that redefinition.

Mass culture. Ideally, we're trying to tap into its brain, live off the body, and redirect it a bit too. Call it "revolutionary parasitism." (he freezes and then reaches to the desk) Not bad — I think I'll use that! Of course, it's dangerous. People may sneer and say, you think you're redirecting it but it's eating you, buddy. Maybe — we'll see.

Of course we all want to soften the existential agony, have the money for a trained crew to roll the boulder up the hill for us, you know — we do have families to support — but some people can't help rebelling, can't acquiesce. Rudy Rucker will be a punk till he dies, no question!

M2: Well, we were thinking of putting a black velvet big-eyed portrait of Gibson on the cover. . .

JS: OH GREAT! THIS IS IT, GIBSON. COÖPTATION NOW! They're doing you in black velvet, man — you're up there with Elvis! Y' know, somebody saw Gibson and Elvis together at a stock-car race, and Roy Orbison was selling them some dope.

M2: You all have that sex, drugs and rock 'n' roll edge. . .

JS: Yeah. People writing it come out of the rock culture or the underground art culture. They're into a whole different set of influences than the majority of the SF field. My first novel is dedicated to Patti Smith and Aleister Crowley. I wrote it ten years ago. It was called *Transmaniacon*, from a Blue Oyster Cult song.

M2: How do you draw it out of you, when you write?

JS: I use the paranoid-critical method. You know that one? Salvador Dalí, great surrealist hack, said the way to learn about things is to see them as if you were seeing them for the first time, like an infant. Then associations beyond the obvious ones suddenly spring into mind. I've also made it a long-term habit to study the way my mind works and the kinds of images and symbols that interconnect.

BREEDING MONSTERS

In 1988, a TV commercial from Motorola — a company that works heavily with computer chips — pre-announced nanotechnology, parallel programming, and implanted chips that interact directly with the brain. They announced a near-future world culture based on electronic intercommunication among people bearing these chips, and they announced it with perfect confidence, as if their technicians had no doubt it would come to pass, and with perfect blindness to its implications.

Cyberpunk looks to that immediate and probable future. It wasn't constructed by the standard process of science-fiction extrapolation. It grew out of the *Zeitgeist*, present time plus, the hypercontemporaneous, whole and steaming and ready for action. It arose simultaneously from diverse sources, and this synchronicity is the mark of its authenticity. The public — the mainstream public even more than the hard-core SF people — immediately responded to The Movement. Its semiotic coloring struck the mind's eye; its freight of symbols came roaring home to us. Shades of Jung! The culture itself generated it.

In a recent Science Fiction World Association Forum some putz claimed that The Movement was old hat — "We've seen this style before," he said, "in certain works by Samuel Delaney." The Movement is *not* a style. It's a level of cultural intensity, a hard rock'n'roll intensity that SF never had before. Its purveyors are characterized by a global worldview, an identification with underground culture in its worldwide manifestations. They're more influenced by non-SF writers and by film than by SF. They have their antecedents — Delaney is one — but they are distinctly writers of the 80's and 90's, informed by its characteristic dilemmas, paradoxes, and passions. They have probably read Bob Black and Virilio and the Situationists and Re/Search as well as Dyson and O'Neil; Dennis Cooper, William Burroughs and Pynchon, Madison Bell as well as Alfred Bester. They're synthesizing things we've been waiting to see synthesized; they're preparing the ground for a revolution. ▲

The only drug I write on now is, occasionally, a cup of coffee. I think you can get jacked up enough just by a state of mind. Almost all of the cyberpunk writers write while listening to music. Lately, I've been writing to *Jimi Hendrix Live at Winterland*, a great record. I used to work to the early Blue Oyster Cult records. And I've been listening to Motorhead and speedmetal people like Player and some of these... troglodytes. Highly energetic urban troglodytes. Sometimes Lou Reed, Rolling Stones.

M2: We want to see the *Max Headroom* shows you wrote.

JS: Good luck. I had two shows written when the show was cancelled. One script was about twins, man and woman. They were criminals, and incestuous. They adored each other. They were into subversive hacking. See, in the future, surgery is electronically programmed. A computer checks you out and decides where to cut. If an electronic surgeon won't pay protection money, during a routine appendectomy, the twins might break into the system and switch the guy's lung with his kidney. There's an open-heart surgery video game; have you ever seen that? That was the inspiration.

But the story was about something else entirely: it was about people who don't believe they are real unless they see themselves on television. I think most drive-by shootings are performed by people who simply want to see the event registered on TV. The problem isn't really television: it's mass insignificance, and also — people who are in a sort of anarchist modality might find it hard to understand, but also — a failure of community. I think it's a major syndrome.

M2: Aside from *Max Headroom*, what other scripts...?

JS: Peter Wagg (*Max Headroom* Executive Producer) is going to do a movie that I'm scripting with Bill Gibson called *Macrochip*.

Do you know about the *New Rose Hotel* movie? Gibson and I wrote *New Rose Hotel*, an adaptation of his short story, for Ed Pressman. Pressman's good — he produced *Wall Street* and *Badland*, which was a great movie, as well as pop things like *Conan the Barbarian*. The director is Catherine



... a futurological Tarot deck of spirits of the urban wilderness. I'm connecting shamanism, computer technology, subatomic physics and the collective unconscious.

which influenced every science-fiction writer, and which no one dared claim as an influence... (*he looks up with a sweet lupine smile*) Now we're all literature. ▲

Quinn felt himself there physically, sweating, aching, short on breath, heart banging, but getting his groove, going into the trance that made it seem possible to dance forever, realizing that the gateway to the other continuum had a corridor and this corridor was the infinite dance; letting your own bodyheat melt you down and sweep you along, moving your hips into the pocket of the beat, completely lost in it... And it seemed to him, as he danced (BAM BAM buh-BAM) in place, in the suit of lights that was his perspiration, that he was on his way somewhere...

He touched the fetish at his neck. A circuit closed.

—from *Shaman*, Asimov's SF, November 1988

Bigelow, who directed *Near Dark* — ever see *Near Dark*? Rent this movie! Look for it in the horror section. It's a punk vampire movie — where the word vampire is never spoken.

Bigelow's really talented. And Gibson hacked out a very intense script. I did the treatment and detailed outline and from that he did the first draft of the script. His draft reads like literature. Somebody should print the first draft of *New Rose* as is.

It seems natural to me to be writing for movies and television. I think visually. My books are written in scenes like movies. I do some summation between scenes but I'm learning to do that less and less. I try to compose a cinematic image in the mind of the reader as exactly as a director would do it — Fellini, Nicholas Roeg. That's hard to do with words on paper.

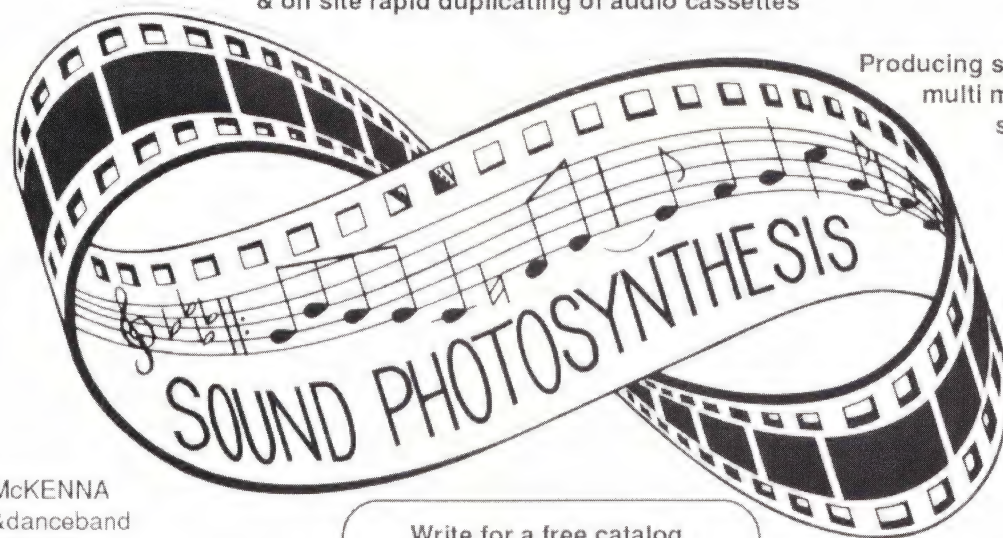
M2: Have you thought about extending the words on paper? What about composing graphic novels? Do you draw?

JS: People have approached me about about turning my book *City Come A-Walking* into a graphic novel. The artist Bill Sienkiewicz may be interested — he's a very hot synthesizer of images. The graphic novel as a newborn art form interests me — yeah, yeah. Everybody says frozen cinema but it is, at its best. And the best of it — like Alan Moore, Frank Miller, Sienkiewicz — is a vindication of the comic books of our childhood,

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RICHARD STALLMAN:

When Richard Stallman first arrived at the MIT Artificial Intelligence Lab there were no officially sanctioned users of the equipment, no passwords, no security, no special privileges. Stallman liked it that way. But the retrenchment that was the 70's hit the MIT lab a few years after Stallman's arrival. Passwords were assigned to Officially Sanctioned Users. So Stallman broke the computer's encryption code and was able to get to the protected file that held people's passwords. Stallman started sending people messages which would appear on the screen when they logged onto the system: "I see your password is (such and such). I suggest that you switch to the password 'carriage return.' It's much easier to type, and also it stands up to the principle that there should be no passwords."

Stallman is the inventor of the original, much-imitated EMACS editor. He also worked on the Lisp operating system and has worked extensively on compilers, editors, debuggers, command interpreters and the Incompatible Timesharing System. His current project is GNU. "What's GNU? GNU's Not Unix. It's a complete Unix-compatible software system that's being written to give away free to everyone who can use it."

*Stallman's non-profit company, Free Software Foundation, Inc., publishes GNU's Bulletin. This sporadic newsletter reports on the progress of GNU projects and includes an order form for purchasing GNU products. Yes, Virginia. They **do** cost money. The difference is that they are distributed with permission to copy and redistribute.*

— R. U. Sirius

THE ORIGINAL HACKERS

MONDO 2000: We are talking to the last of the hackers.

RICHARD STALLMAN: My name is Richard Stallman, my rank is general nuisance, my cereal is frosted flakes.

The term hackers was invented by Steve Levy. According to him, the true hackers were the ones at universities in the mid 60's and into the early 70's — they were working on large computers. Then the hardware hackers who designed the personal computers in the 70's — they're second generation. The third generation is the game hackers of the late 70's and 80's. So when he calls me last of the true hackers he means the last of that generation, the last person carrying on the attitudes and spirit of that generation.

M2: Would you agree that you're the last holdout from that generation in terms of staying true to the hacker's ethic?

RS: It's certainly true that a lot of them sold out. I don't know if there actually is a hacker's ethic as such but there sure was an MIT Artificial Intelligence Lab ethic. This was that bureaucracy should not be allowed to get in the way of doing anything useful. Rules did not matter — results mattered. Rules, in the form of computer security or locks on doors, were held in total, absolute disrespect. We would be proud of how quickly we

would sweep away whatever little piece of bureaucracy was getting in the way, how little time it forced you to waste. Anyone who dared to lock a terminal in his office, say because he was a professor and thought he was more important than other people, would likely find his door left open the next morning. I would just climb over the ceiling or under the floor, move the terminal out, or leave the door open with a note saying what a big inconvenience it is to have to go under the floor . . . "so please do not inconvenience people by locking the door any longer." Even now, there is a big wrench at the AI lab which is entitled "the 7th floor master key" to be used in case anyone dares to lock up one of the more fancy terminals.

The original hackers didn't break security just to be naughty.

M2: So the ethic, to some extent, lives on. Would you say it permeates the computer industry, or a large portion of it?

RS: The basic desire is widespread. But most people just think, "Boy, this company is stupid. They pay me a lot of money and then arrange for me to waste a lot of my time. Aren't they silly? Well, it is their money." So they're bought and no longer have the morale to say, "Shit — I am not going to put up with this bureaucracy."

The term hacker has come to be associated exclusively with breaking security. That isn't what it is at all, but hackers were willing to state their total contempt for security people, because security was one form of bureaucracy.

First generation hackers would break security because it was in the way of doing something useful. Now a lot of kids do it 'cause it's naughty. Though it is true that showing that you can break security that's said to be unbreakable is a nice hack, the original hackers did not break security just to be naughty. We broke security if somebody had locked up a tool that you needed to use.

M2: A lot of kids who break security think of it as a challenge to get into a system.

RS: They're caught up in playing a game where they and a system administrator are trying to show who's more powerful. Which is a waste of time, and that's the exact opposite of the original hackers' intention. What happens is a system administrator puts in more security measures, and then the security breaker tries to beat those. It's a waste of time and energy. A tedious, sick game.

System administrators don't realize that by playing the game they keep it going. Most security measures don't provide security. They simply raise the level of sophistication at which

LAST OF THE TRUE HACKERS?

the game is played. The game gets in the way of people trying to do any work.

HACKER HIPPIY ETHIC

If you're a hacker, you don't want to sit there collecting pay, you want to get work done. So you don't wait around for permission or consult some authority if you can fix something yourself and go back to work. This, to me, actually *defines* a person of high moral values. A person of low morals just follows orders and thinks, "It's their money." I don't think that's a happy way to live — even if you do get money for it. So the hacker ethic is perhaps a little bit like the hippy ethic, not wanting what you do to get money to be separated from the things you care about. The idea is to have the enjoyment present in everything.

EXPERIMENT IN FREEDOM AT MIT

The hackers at MIT who designed and built their own timeframe system decided they wouldn't have any security. So they designed a system where there was just no way to set up controls on what anybody else could do. While you were logged in, you could do whatever you wanted to. And if anyone else logged in they could do other things, but there was no way to project your influence beyond your actual presence. The results were very nice. There were never any system administrators and you could always fix things if they were broken.

M2: In a community where all users are competent and ethical that would work.

RS: We educated users to become competent and ethical by having this system! By designing a system that worked and sustained itself, we showed people what it was to be autonomous and a good member of society. People saw that something interesting was going on. We educated people to be competent, encouraged them. We pushed people to learn how to fix things, do things for themselves. We would let just about anybody come and use the computer, give anybody a chance.

We had lots of guests. Our idea of a good guest was somebody who would work on improving the operating system. This is a totally outrageous and subversive idea now. But to us, it meant becoming a contributing member of the society. And the most useful thing for any guest to do was to learn to program, and learn about the operating system, and be able to improve it, because this system was not a static entity. What seems most extraordinary about it today, of course, is that there could be that much trust. It worked!

M2: Why did it change?

RS: A company deliberately hired away as many of the hackers as it could.

HOW OLD HACKERS BECOME UNFRIENDLY

M2: Why did the people leave?

RS: They were offered the chance to get rich.

M2: Or perhaps they had a system that they wanted to get out and they thought this was the most effective way.

RS: That's a rationalization. I think they did permanent harm by destroying the hacker society in the AI lab. Now there is no longer an example to open the eyes of people who think that bureaucratic control has to be. Before, we could show people, give people that unique experience.

M2: The sad thing is that people in the industry are unable to share — unable to be free and open about everything they do.

RS: That's right. I'd say that they've hurt themselves spiritually. They've decided to obey orders that, essentially, make them unfriendly to the rest of the world... "We're going to withhold information from you." Of course, this is considered normal but it is really a very sad thing.

SHAREWARE

RS: In the hacker community, software was always available to share. Any program that anyone wrote — if you wanted to get it and adapt it to your own needs — *of course* that's what you should do. Then



Making people feel guilty about something as natural and loving as sharing a program with your neighbor is a sad thing.

people discovered that by becoming obstructive, they could get rich. Imagine any other industry where one of the rules is that I won't sell my product to you if you're going to share it with anyone. It's ridiculous. And the sad thing is, good programs are going to waste because not enough people get to use them. If only half as many people get to use a program, it's half wasted.

Software is very different from material objects where, you grow a certain amount of wheat, it makes a certain number of slices of bread. Whether you sell it for five cents a slice or 5 dollars a slice, it still only makes so many sandwiches. That is not true with programs. You can copy a program and you cannot, in the same sense, copy a loaf of bread. So anyone who tries to stop you from copying a program is doing real harm to society — setting up scarcity where there isn't any. They're also poisoning the spirit of scientific cooperation and the free interchange of ideas. People use pieces of all sorts of programs because that is, by far, the easiest way to get the new programs written. Now we're losing the ability to take a program and improve one aspect of it without having to redo the whole thing, the ability to adapt programs in new ways so you can use them, the ability to fix it yourself if it is broken — we're losing years in wasted time. Same old bullshit.

M2: Isn't it true that no matter how hard people try to have control over software and to be proprietary about it, most people wind up getting a hold of the stuff anyway?

RS: Getting a hold of it, yes. But being able to change it is very difficult if the sources are kept secret. No one gets to fix it, or adapt it, or build on it. And many people are prevented from having copies of programs because they are scared. This may seem foreign to you, but some people obey the letter of the law. Making people feel guilty about something as natural and loving as sharing a program with your neighbor is a sad thing. People are being taught that sharing is wrong. Imagine if food at the supermarket were sold subject to a license that you could not let anyone else taste of the things you prepared from it.

M2: If you could buy one can of beans and pass it around and have everyone wind up with their own can of beans, then you probably *would* have a law like that.

RS: Of course. Businesses that are unnecessary want to survive anyway.

FREE SOFTWARE: "A MATTER OF FREEDOM"

M2: The consequence of this new technology is to make the whole proprietary thing obsolete. Right now, the society that we are stuck in has a lot of people running around hustling just to get by. But doesn't the very nature of the technology ensure that you'll inevitably win?

RS: Not necessarily. I don't see that. The people who are wealthy control the government. They're going to continue

making laws and using the police to enforce them. They can go on for a *very* long time because the ownership of information is self-perpetuating. If the information is free, everyone gets it. Everyone is equal. When information is hoarded, the ones who are wealthy get it and the ones who aren't don't. And it's ephemeral. If you're without food, you know it. But if you're getting ersatz information, you can't always tell the difference.

The usual justification for hoarding information is to reward people for generating it. My response is that we should reward making information *available to use*. Generating or compiling information and then hoarding it does not deserve as much reward as generating and compiling information and letting people use it.

M2: Also, sharing information leads in a synergistic fashion to more knowledge.

RS: Absolutely. Things are done ten times, fifty times, by different groups of people without the benefit of seeing how it was done before. One software patent actually makes the outrageous claim that you are not allowed to type the commands into your computer to make it do a certain thing. Imagine that! Free software isn't a matter of price, it's a matter of freedom. Free software is about the freedom you have in using it and sharing it. I refuse to buy commercial software, but I would refuse to buy it even if the guy gave it to me at zero price because I won't agree to the conditions. I won't agree not to share it with someone who would like a copy. And I won't agree to not have the sources and be helplessly at the mercy of the hoarder of the information. What I have decided is that rather than surrender to those terms, I will reject them and I will write myself the software I need. That is why I launched the GNU project.

IF YOU CAN COPY IT, TAKE IT HOME

M2: The idea of information being free is a metaphor for an ideal society?

RS: No. Again, we can separate material goods from information. We have linguistic prejudices from the domain of material goods that are built into our social system. You *own* a material object because you don't want to be deprived of it. You don't want anyone to take it away. That's because material objects can't be just trivially copied. You would probably be upset if your car were stolen but if, while your car was parked, somebody drove up with a car copier and made a copy and drove the copy away, your car would still be there when you came back . . . and you probably wouldn't care.

M2: When someone spends their lifetime designing a specific piece of software and then anyone can come in and copy it, how do they get payed? This would take some restructuring.

RS: Well, first we need to question three popular ideas. One is that people will only program if they can make money at it. Second, that there are only two choices — making no money or making a lot of money. Third, that the only way people can get paid money to program is through the system of ownership.

As far as incentive goes, you have to remember that programming is addictive. Ten years ago, there were articles about people who had \$100 a week habits — they were mainlining every day! Recently there have been articles about what to do if you are losing your spouse to a computer. And then they want us to believe that no one will program unless he is getting paid? It's a bluff.

THE MYTH OF THE THIRD GENERATION HACKER

M2: What do you think about the myth of the third generation hackers who can get into just about anything?

RS: I think it's just that — a myth. They can get into lots of places that do not bother to have any security or who accept a machine from the manufacturer with field accounts for service and who never change the password. It is pretty straightforward how you can make getting into a computer impossible. It is just that there are many places which do not bother to do it. Most of the people breaking security are not able to get past anything that is the least sophisticated. I understand that the Defense Department really does use very sophisticated security measures.

M2: So in other words, when a hacker penetrates, they've decided to let that stuff be penetrated?

RS: Or nobody thought to protect that particular bit.

"PEOPLE WHO SELL SOFTWARE ARE CRIMINALS"

M2: Your value system would not necessarily prevent you from taking from people who are trying to be proprietary, from grabbing it, using it, and making your own changes.

RS: Right. Software hoarding is a crime. If I can thwart that crime successfully, protect its victims, then I will do it. All the people who sell software are guilty of this crime.


M2: Given that there are these financial incentives for people to hoard and not share software, do you see any hope for a shift back to the hacker ethic?

RS: Young people. Each generation produces people who see the emptiness of it all. They have the energy to try to do something about it. For the most part, they've all felt isolated.

M2: This idea that information should be free, is this something that is specific to computers? What about works of art or bootlegging records...

RS: I would say that whenever something can be copied by the general public, the general public has a right to do so. The more society becomes information instead of material objects, this question of whether a person can copy things will make the difference between a world of universal prosperity or a world of constant rat race. You can create so much artificial scarcity by owning information. Once the great bulk of the things we value is information, the only thing to do is eliminate ownership. ▲

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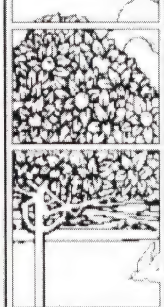
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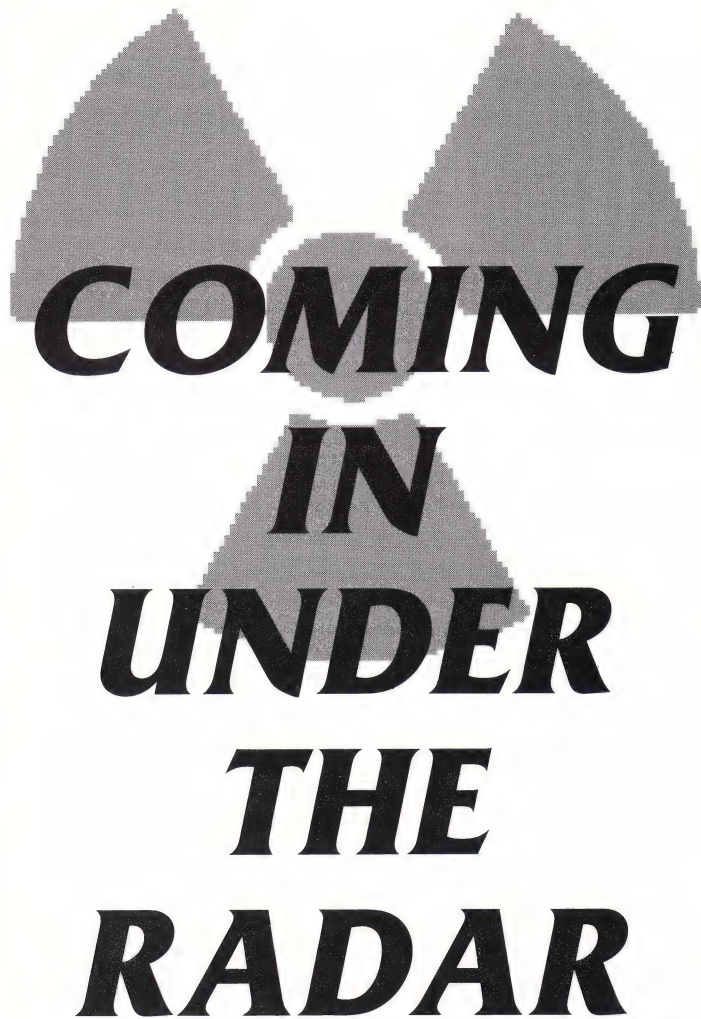
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COMING IN UNDER THE RADAR

Bruce Sterling
interviewed by Jude Milhon

A new movement in science fiction was quickly recognized and given many labels: Radical Hard SF, the Outlaw Technologists, the Eighties Wave, the Neuromantics, the Mirrorshades Group.

... But of all the labels pasted on and peeled throughout the early Eighties, one has stuck: Cyberpunk.

... An unholy alliance of the technical world and the world of organized dissent — the underground world of pop culture, visionary fluidity, and street-level anarchy, this integration has become our decade's crucial source of cultural energy. The work of the cyberpunks is paralleled throughout Eighties pop culture: in rock video; in the hacker underground; in the jarring street tech of hip-hop and scratch music. . .

... This phenomenon, this dynamic, has a global range; cyberpunk is its literary incarnation.

— Bruce Sterling, in the preface to *Mirrorshades*

BRUCE STERLING: Reality Hackers? (*His voice comes out of Texas, but it's taken the long way around. His accent is that of the culturally alienated Texan — hard, flanged-out midcountry with a nasty edge.*)

MONDO 2000: Yes, we're putting together a — er, well, we were going to call it a Cyberpunk issue . . .

BS: I guess John Shirley must've given you an earful about the Cyber-word.

M2: Yeah, "look, ignorant journalists have been blasting us with this term." But he uses the word freely himself. Maybe he just likes to rub it in, because it does rile people up. I mean, like in that issue of the *Mississippi Review* . . . (*Mississippi Review* #47 & 48, 1988, *Cyberpunk Issue*, edited by U.C. San Diego's Larry McCaffery)

BS: I take that thing as a vulgar assault. It makes us sort of interesting light bathroom reading.

M2: You know, Gibson can't even say that Cyber-word. He chokes on it. What's going on? Are you guys ditching the Cyber-label until the dust settles?

BS: I don't think it's a case of the dust settling, or the hostility — that doesn't frighten us. What rankles is the way that word can be used to dismiss our work, right? When we first started cyberpunk, we really wanted to come in under the radar — out of this little science fiction subculture — just knock people flat on their backs. And we really did it. Nobody could have foreseen the futures we imagined. But now, with your third and fourth-generation cyberpunks — what people call sci-fiberpunk — it's too easy to lump us with people who are just derivative ripoffs, commercial spinoffs. It was clear that it wasn't going to be long before there would be cyberpunk action figures. We were being ripped off by people who didn't pull their weight culturally.

M2: What does it mean to pull your weight culturally?

BS: Well, you've got to contribute some kind of energy, you know? People are just cannibalizing our imagery. Selling it. Did you see Nancy Reagan breakdancing? It's the same: co-optation. No use our putting any more of our energies into "Cyberpunk, Trademark."

M2: Well, hang on. Does the original vision still stand?

BS: Oh, yeah. And we're coming in under the radar in a much more efficient way now. In the *Mississippi Review*, we're hitting people who are literary — intellectuals, academics. Not just the sci-fi people. Our books are reviewed in *The New York Times Book Review*. Gibson's in Hollywood. We manage very well under our own names, unlabeled, although this isn't to say that our collective vision is no longer there. You know, Gibson and I are doing a book together now. Shirley and Gibson are collaborating on screenplays. We just shut down the neon sign. Our only business is to unexpectedly fuck people up.

M2: Such a business! A lot of people have a secret desire to live part-time in the matrix.

BS: Well, in an early Gibson story — *Burning Chrome*, I believe — there's a codebreaker, the Russian Program, which makes its path through the Matrix by taking the identity of anything it meets, assuming and then discarding it along the way. Quote, Cyberpunk, unquote, is the Russian

Program. The point is, if you freeze in time, the Matrix simply eats you away. We're not in this to do Coke commercials, OK? And the pressures of commercialization are very intense right now. It's difficult to maintain any sort of little scene without seeing it immediately bought and sold.

M2: Well, it's sweet to produce something so potent that it has to carry its message, like a virus. Like a cultural virus.

BS: Sure, if you don't get intercepted. The way they do it is to put a label over it and then sweep under that label the disreputable and the forbidden. Then people can say, oh, we know about Cyberpunk. This stuff is awful! These people are terrorists.

M2: Yeah, cultural terrorists. Now, the Movement . . .

BS: If you talk about the Movement, it's as bad as using the dreaded "C-word." Everybody knows you mean me and Shirley and Gibson, Rucker and Shiner. There're other people we know who are good, but essentially the Movement is those five guys. Lewis Shiner — he has *Deserted Cities of the Heart* out this year — has taken great pains to dissociate himself from the Cyber-word. *Heart* isn't even called a "science fiction novel." It's about time travel and Mayan mysticism, it's about mushroom eating and black magic and radical politics in Central America.

M2: Sounds diverting.

BS: But he won't say, "Here I am, CyberShiner, as excerpted in the *Utne Reader*." If you take on that ID, the people you really want to reach may block out anything you say.

M2: It seems admirable that you guys can collaborate so much. How do you work with Gibson?

BS: Well, he handles the business aspects of it and I'm doing the background research, keeping track of historical developments and working out some of the plot. I'm a journalist by training, and Gibson's an English major-cum-high-lit type guy. I'm content to go smuggle out the facts and he runs interference.

M2: Do you pass disks back and forth? Are you on line to each other?

BS: We mail disks. It's cheaper and it's almost as fast as a modem. We get together as much as we can, lots of telephone conversations. But, you know, Gibson and I have known each other for many years now. We know how the other thinks, so we can set a . . . we know the vibe.

M2: Isn't there any territoriality, like, "Don't fuck with that sentence — it stands or else!"

BS: No, we don't really wrangle over that sort of thing. We're handling different sections. And we have an agreement that each section that's rewritten will be accepted. If something is deleted, we've agreed not to put anything back in.

M2: Shirley said that Gibson tends to be the polisher, the stylist . . .

BS: Bash it out now, tart it up later? That's sort of how we work. I'm doing a lot of the first-draft work. And he's doing second drafts and some of the larger chunks of the specific things he enjoys. I'm generally more didactic, theoretical, than he is. I like to write the exposition and he

likes to do the action scenes. Our abilities and tastes complement each other.

M2: Right now you're doing *Difference Engine* together. Where the hell did you get Victorian cybernetics? This is so bizarre!

BS: Science fiction is about the industrial era, right? The nature of technology. And if you really want to get to the conceptual roots of how we got into this mess, you've got to go back to the 19th century.

M2: It's the industrial revolution, then? It's the dark, satanic mills?

BS: Well, not in this version, no.

M2: No? It's the light, angelic mills?

BS: Yeah. That's more like it. There's no Romanticism as a movement in this version of history. Lord Byron, for instance, went into politics and became Prime Minister of England. So he's a politician rather than a poet. There's no Keats, no Shelley — not as Romantic poets. Some of the poets are hackers. Shelley's in prison, Coleridge is in



America, so is Wordsworth. Romanticism's never a happening thing. The Enlightenment just went headlong into the Industrial Age.

M2: So there is sort of a neo-rationalism as a continuation of the Age of Enlightenment.

BS: Yeah. Except it's got much better hardware. (*maniacal laughter on all sides*) What Shirley said about writing — science fiction especially — is that it's a mirror you can edit. So what we're really talking about in *Difference Engine* is the nature of cybernetics and the information revolution and what it's doing to our own society. Projecting it one hundred years into the past is like watching the course of a disease in another species. It brings things out in starker relief.

Things have changed since the early days of the Cyberword and I, for one, am a lot more interested in the deep theoretical issues. Sure, I do stuff that's like MTV video, flash imagery — but with a sting in the tail. I want to get behind people's eyes. The goal is to understand the situation we're in, to go beyond the stage of, "Well, I'm hip. I know the vocabulary." I want to get to the stage of knowledge as power.

M2: There are people who would like to become cyborgs for the sheer intellectual ecstasy of it. Are you interested in that mystical aspect of knowledge as power?

BS: No, I'm not a mystic myself. This notion that there's some plug into God and you'll always be there . . . it doesn't work. Eventually you have to get up in the morning, look at the red of your eyeballs and think, "Where's a cup of coffee?" Consensus reality is the cup-of-coffee level. But consensus reality is a fragile thing, predicated on a lot of assumptions that aren't questioned. That's what I'd like to get at. I don't see much point in just whiting out and transcending the body or whatever. That brings its own level of debilitating trouble. I think that if you *could* become a cyborg for reasons of intellectual ecstasy, one day you'd discover that you've passed out in the street and there are roaches living in your artificial arm.

M2: But Gibson seems to have that emotional undercurrent in him. Wanting to be in Wintermute, to join the AI minds.

BS: It's part of the gig. The element of transcendence is just a feature of the genre, like feedback in rock music. It's a move. Like I wrote a book — *Schismatrix* — that ends with a character attaining cosmic transcendence. He's eaten by an alien and becomes this pure spirit who gets to go around the universe and observe. It's just a riff. People who take that stuff too seriously end up turning into trolls.

M2: What do you mean?

BS: Well, H. P. Lovecraft was a big fan of that cosmic fear-type stuff. He was sort of a homemade Buddhist. He practiced what he called psychological self-annihilation: "I may be only this mortal human being but my mind can range the cosmos." That may be OK for him, but from the outside what you see is this pasty-faced guy eating canned hash in the dim corner of a restaurant, hands trembly and a gray film over his eyes. You know? He was a sick old man

who died young. A troll. You've got to remain equipped to deal with this world. Now me, I've got an album to do, as it were.

M2: We've got another musician here. What do you play?

BS: As it were, as it were. I don't play anything. I just hang out. I talk rock slang, because it's part of the gig.

M2: OK, OK. What kind of music do you listen to?

BS: I always thought my tastes were idiosyncratic until I talked to a friend who works for A & M Records. She said, "Oh, yeah. Alternative college circuit." Great to be a checked box, demographically. Right now I listen to Sugar Cubes, Sisters of Mercy, Feelies . . . *Le Mystère des Voix Bulgares* (those weird-ass Bulgarian folkies . . . trippy soaring stuff), some Steve Reich. Here's some Handel and Mozart played on Japanese Kotos . . .

Sure, I do stuff that's like MTV video, flash imagery — but with a sting in the tail.

M2: That sounds really nasty.

BS: . . . Let's Active, R.E.M. I like listening to Latin Hip Hop like Lisa Lisa and Cult Jam. Anything produced by Jimmy Jam and Terry Lewis. Those guys are Pop Gods.

M2: This is sounding like *Spin!* Let's keep it up. Do you have strange pets?

BS: I've been known to keep mantises.

M2: I loved the mantis in *Artificial Kid*. So beautiful: green, arm-long . . . breathing audibly through spiracles as big around as my little finger . . .

BS: Yeah, most of my books have a mantis in them somewhere. That book dates back a bit. I wrote that in 1980. Before the Cyber-thing. People have called it the first Cyber-thing book. I don't know if it is. I don't really care. But it's definitely one of the first science fiction novels to have a guy who's like actually punk.

M2: Were you part of a local punk scene?

BS: Well, only as an outsider . . . typical. I knew people who were busted at Raoul's, during the Austin — ah, "troubles."

M2: What are your current obsessions?

BS: Work is generally on my mind at the moment. Work rather than, like, PR. I've done PR. Read my introduction to *Mirrorshades*. I think it stands as the central PR document for the Cyber . . . look, some people think we did this just to be cute. You know? They're wrong, very severely wrong. We meant it. And we did it because we were driven to do it. That's the way we're wired.

M2: Ah, speaking of PR, can you send us a picture?

BS: No. Sorry. Don't have any pub shots. (*The steel in his voice is like to flay the phonecord.*)

M2: Oh yeah? OK, too bad on the PR front. Listen, does your wife draw? Any nude sketches of you we could feature?

BS: No, I don't have any nude drawings and it's just as well if there's no photo at all, I think. I don't have to worry about that. I write words.

M2: Isn't it funny how writers usually fear and loathe...

BS: Graven images.

M2: ... to have just anybody looking at your surfaces?

BS: Well, if Pynchon can get away with it... ▲

#12. MASS DEFECTION. "We want to join your Kluster," the Superbright said. "We must join your Kluster. No one else will have us."

Nikolai doodled absently with his light-pen on a convenient videoscreen. "How many of you are there?"

"There were fifty in our gene-line. We were working on quantum physics before our mass defection. We made a few minor breakthroughs. I think they might be of some commercial use."

"Splendid," said Nikolai. He assumed an air of speculative pity. "I take it the Ring Council persecuted you in the usual manner — claimed you were mentally unstable, ideologically unsound, and the like."

"Yes. Their agents have killed thirty-eight of us." The Superbright dabbed uneasily at the sweat beading on his swollen forehead. "We are not mentally unsound, Kluster-Chairman. We will not cause you any trouble. We only want a quiet place to finish working while God eats our brains."

— from 20 Evocations by Bruce Sterling

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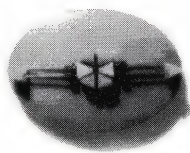
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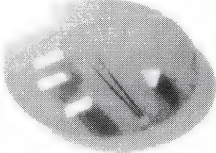
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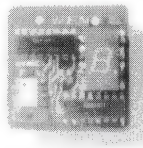
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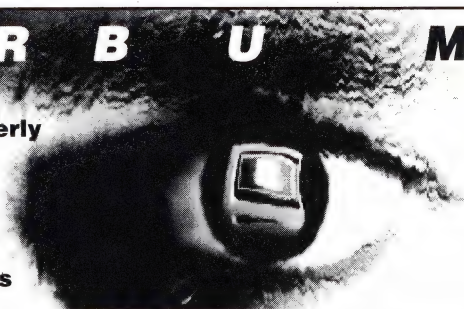
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Beyond Hacker Machismo

An Interview with Todd Rundgren

Jas. Morgan, Morgan Russell, Steve Ananda

"Sometimes famous people find it refreshing to be snubbed," said Jas. reassuringly.

I was busy peering at numbers on mailboxes. "There it is!" I cried. "69!" Did someone, sometime, pay to get that, I wondered?

A sultry madonna opens the door. Todd is folded in an easy chair reading a book on 3-D Interactive Video. He greets us in a relaxed good-natured way. If "Todd is God," he is not a wrathful deity. We are an hour and forty-five minutes late. We shuffle into our seats as Pixel, Todd's dachshund, investigates our shins.

There is a grand piano at the far end of the room arrayed with Erik Satie sheet music. The nearer end of the room has a House of God surplus pulpit and a kimono draped on the wall. A mobile of origami birds flutters nearby. Great party room, I note. A window-seat runs nearly the length of it. But horrors! It's got an obstructed view! My preconceptions about rock stars are dashed as I look out the window at the neighbor's asphalt shingles.

Todd's own vistas, however, are in no way obstructed.

Todd drapes his languid sweat-shirted frame on the couch. Easily, fluidly, he tosses back answers. He is good at thinking on, or off, his feet and has an uncanny way of anticipating our questions.

— Morgan Russell

TODD RUNDGREN: Well, I want to get beyond the bit-twiddling, dealing with the machinery: that's just hacker's machismo. I mean, theirs is hard-won knowledge, yeah, but the real objective is not talking to this retarded machine — it's dealing with the higher conceptual levels of what you want to do.

I have an argument with the basic philosophy of the Macintosh, because of a very simple metaphorical thing. The Macintosh is the desktop. And therefore, it's the turtle upon which the world is sitting, you know. And my philosophy is that the interface that I've developed — HyperCode — is just a peel-away overlay on top of the stuff that you actually want to be working with.

MONDO 2000: Your software incorporates a different worldview, then . . .

TR: Um, yeah. It's actually completely different. Because it doesn't run applications. My software recreates the way people metaphorically view the world — as an interrelationship of things. Applications are iconic, symbolic — like that big fat guy who couldn't get out of his house, so his entire experience of the world was only what fit through the door into his house. And the premise of my

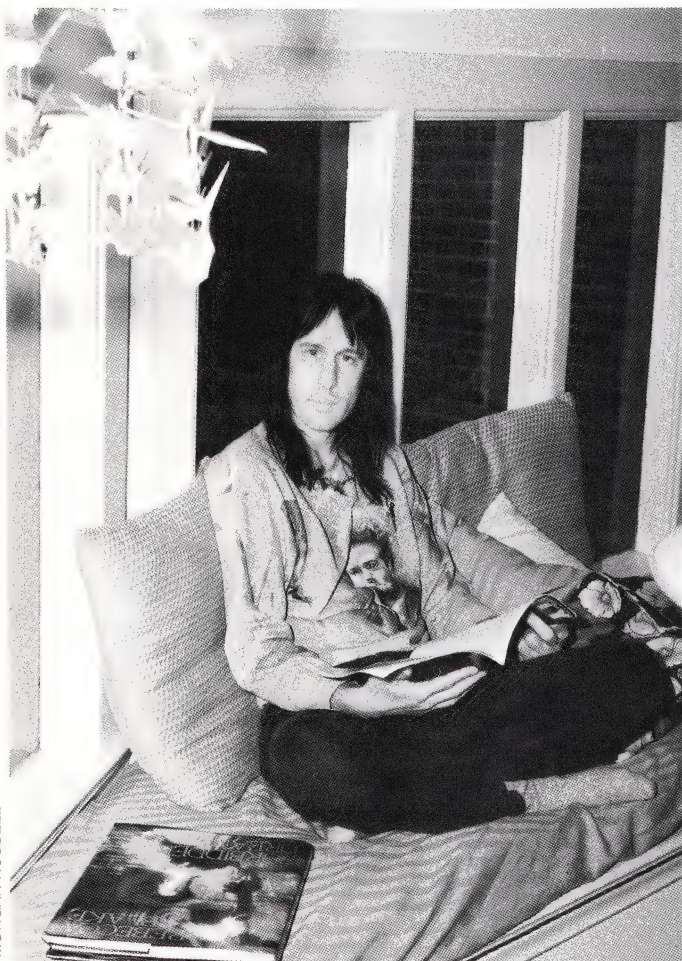
shell (operating system environment) is that you should be able to go out and meander around in the world, go from data document to data document, and whatever you get to, it looks like what it is. There's no generic representation of little pages or icons. You see the content of the picture, the text of the document. You just browse around, and when you find what you want, the tools that work on it are there. You can edit tools, throw away obsolete tools and pick up new ones. It's a departure to the extent that there is no existing Macintosh software that runs under it. It won't start up an application because it doesn't know what an application is, you know? It knows what all these objects are, and for its own benefit has them in three or four superclasses; but everything else is really up to the user. The other philosophical thing that I'm trying to embody is that there is a continuum of programmability; there is not some dividing line between being a user and being a

All MIDI has done is empower a whole new generation of Dreckmeisters.

programmer. You should be able to accept or change your operant world top to bottom — not just the colors of the screen or the fonts of the menus, but all the way up to altering the system itself, writing system-specific code — sophisticated things you have to acquire some knowledge to do — but there's no dividing line separating audience and performer.

M2: Well, that sounds great, to be able to personalize everything in there, rather than having to bend your nervous system around . . .

TR: Um-hmm. Well, you know, there's always a certain limit to that. I mean, the shell itself does have certain constraints; mostly to obviate the users' creating a greater ergonomic load on themselves. Certain things that you expect will be there, in the same way that in a Macintosh application, you expect the menu bar, the command bar, a palette of tools . . . but in my environment, you can change everything to your personal taste without having to go into a specialized so-called programmer's mode, like ResEdit, and get down there and do dangerous, unpredictable



things. With HyperCode it's expected that you will modify the environment to your personal taste.

M2: Macintosh is limited by the desktop metaphor, but you're creating your own metaphor.

TR: Well, put it this way. You can't get rid of the fucking menu bars on a regular Macintosh application. They're always there. With my design you can get rid of everything. My interface is just a peel-away thing that lays on top of your world. It's got elements that do your so-called filing operations, stuff like that — but a single key zaps the entire interface, and you're just purely looking at your data.

M2: MacWeek mentioned that three software publishers are already interested in your paint program.

TR: Yeah, we're still involved in discussions. I've got, not a paint program — but kind of a paint environment. It depends less on "computery" artificial electronic tricks, and behaves more like a painter expects; like pigments and brushes in the real world. Actually, this is the Trojan horse that will get my system shell into people's worlds.

M2: And then, unbeknownst to them...

TR: Unbeknownst to them, what they think is an application is really the hub of an extensible environment that will grow and grow and grow! And eventually, hopefully...

M2: Take over the world? ... Holy Ted Nelson!

TR: Ted and I go way back... but his focus has been different. Xanadu is involved with the World Library thing, and for me it has always been more personal. I've always tried to create personal environments, although they include, of course, all these connectivity elements.

M2: Interpersonal environments, then? ... Merge disks with somebody and share realities?

TR: Oh, yeah; there are protocols in the system that allow users to create a world that is personal to them, break it up into smaller pieces of reality, and ship it off to somebody else to become an element of that alien environment. Connectivity mechanisms.

The shell supports multi-tasking and input and output redirection. So, I can open up an environment, look at some data, and then make a copy of that environment and both environments will be looking at the same data. So if I redirect the input from the second environment, say to Lil, who's coming down the network... then she and I will be looking at the same data, but separately. And if she connects me up to her environment, I can make connections to her data that won't be valid unless I'm with her... kind of looking at her as a logical device, you see.

And if you extend the possibilities of connectivity, ultimately, you get transparent access to whatever is available, wherever it happens to be. The only thing you would have to keep track of is your password — how to hook into it. Just consider: fiberoptic systems are going to replace your telephone and, eventually, your cable television. They'll merge into one communications pipeline, with specs mapped to human sensory bandwidths. Sixty frames a second at full resolution, CD-quality sound, full band for whatever other senses — all generated and transmitted in real time. The ultimate reward will be that we won't notice that there are such things as computers, any more than we notice telephones nowadays. The interfaces between you and everything will be perfectly transparent.

M2: Interfaces efficient enough to pilot the cyberspace Matrix... have you been reading any of the cyberpunk writers?

TR: I have some friends who write cyberpunk stuff... and to me, there's too much of a smell of burnt rubber to it. William Gibson, Rudy Rucker, and people... It's too — it's still a little self-conscious. And, even though this may not be the writers' emphasis — there's still too much fascination with computers, and not enough about what the hell are we going to do with them? Are we going to keep filling the world up with junk? Will we just reamplify the noise? Or have we acquired some wisdom? To me, there's this hierarchy of data, as opposed to information, as opposed to knowledge, as opposed to wisdom. Hardware and software are intermediaries in the quest for wisdom. If we remain obsessed with them, then we won't accomplish much.

This brings us to the music thing. All MIDI (Musical Instrument Digital Interface) has done, in my estimation, is empower a whole new generation of Dreckmeisters, you know? When I heard new releases by the Beatles it was an opportunity to learn, to be exposed to some new thing. It was not just changing my wallpaper. It was knocking out the wall and putting an addition onto the mental house. I don't think that can be said about music or the expectations people have for music nowadays.

M2: But occasionally things do still come through . . .

TR: Someone like Kate Bush or Peter Gabriel, Talking Heads occasionally, or Van Morrison . . . often not the ones the public identifies with. There are still people who believe that they have some real things to express, regardless of the consequences.

I just can't bring myself, at this point in my life, to write music that I don't feel strongly about. An album requires 10 songs. If I can only come up with six, I don't have an album. I can't write the filler songs. I can't get the second verse, unless I feel strongly about it. To truly be a musician is to be blighted, in that old Vincent Van Gogh sense. It's not to be calculating enough to stay abreast of what so-called art is, what the trends are. And I think at this point I don't have the energy, or the desire, or the rationale to do that.

M2: A few years back Tim Leary made a remark that the pop stars of the future will be wearing lab coats. Is there any truth . . . ?

TR: I think that's very perceptive and valid. I don't know whether they'll be wearing lab coats, though they may have their little pocket pen-protectors. The Hackers Conference is to me what pop music once was. It embodies all the reasons why I got into music. It is breaking rules. It has a very broad horizon — what's acceptable to do and what's meaningful to do, and it requires an almost religious commitment to acquiring special knowledge. I've known people who are the equivalent of Eric Clapton on the computer because they have transcended technique. They

are truly artists at what they do. They produce changes in a day that take me a month. I would like to be on that level. But at the same time, I recognize that they are working on a level that, in ten years, is going to seem like bit-twiddling. Nobody's dealing in anything more complicated than Hypertalk, and even Hypertalk is more complicated than it needs to be.

Many of my songs I dreamed fully realized. I dream that I am in the control room, listening to something on the speakers, and it is this piece of music that I have not written yet.

yet.

M2: !!!!! Has this happened often?

TR: This has happened so frequently that I can wake myself up and remember substantial parts. I don't know whether my subconscious has been working overtime writing these songs without my help and then revealing them to me, or whether they're transmitted to me by some kind of muse or angel, or whether there is a difference between the two. For that matter, how can I say the songs that I consciously write are written by me, you know? How can I say that I'm not being transmitted this stuff? I don't know.

M2: Are these lucid dreams, where you know you're in the dream state and you turn the bass up a little bit . . . ?

TR: They're lucid to the extent that I realize I'm dreaming and wake

myself up to write the song down. Of course, I've had some horrible nightmares, too. I remember once I dreamed nested wake-ups, I woke up in a hotel, went to the window, looked out and said, "Oh, I'm dreaming." Woke myself up again, went to the window, "I'm still dreaming." Woke myself up, went to the window . . . seven times before I realized, "OK, now I'm awake."

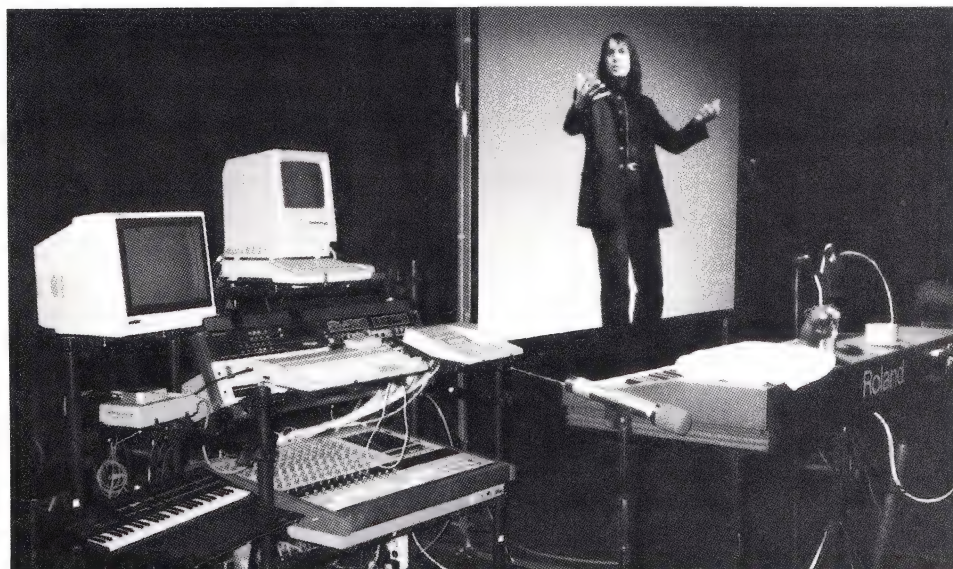
M2: There may be an eighth time coming!

TR: There may be another, yeah! ▲

MORGAN RUSSELL



For more on Todd or Utopia contact The Nexus, which publishes the Utopia Times (Newsletter) twelve times a year. \$18.00 for one year, \$25.00 Canada, \$30.00 Overseas. P.O. Box 867 Canton, CT 06019 — 203-693-2021.



MISAO P. KOBAYOSHI — LISA OSIA

Extensions of Reality

Todd Rundgren at Autodesk

Consider the hammer as a metaphor for the personal computer. (This may not be a new metaphor, but I am putting it in a much more romantic light.) What did man do before he had a hammer? Well, essentially, he picked up a rock and hit the object of his desire. Then somebody got the idea of attaching a larger rock to a wieldable stick. It must have been a real hassle getting that rock on the end of the conceptual handle, because solving this problem involved developing some new technologies. Then there was the problem of learning to use the new tool: mashed thumbs, smashed hammers. The third problem: once they made this hammer, and then learned to use it brilliantly, they were so delighted that they went around hammering everything in sight. When the only tool you have is a hammer, every problem looks like a nail — that's the way we use computers in this, the Stone Age of computing.

The first computers took an entire room full of shit in order to add up numbers. You had humongous power consumption; you couldn't even flick it on without a maintenance man in the room. It was a long way to go to add up a bunch of numbers. I mean, your capabilities were neck 'n' neck with a Hong Kong monkey merchant with an abacus.

Computers, like hammers, have been difficult to build because new technologies have had to be invented. Then, their applications have been limited by lack of skill and sophistication on the part of the users; they've had a hard time visualizing the capabilities of these machines. Finally, the users would apply them to the wrong problems. You probably remember some of these — like cookbooks or telephone lists where you had to haul the computer into the kitchen, turn it on and open the file in order to get the

recipe to make tomato soup . . . "Open the can." Also, we fixate on particular hardware or particular brands of software, a particular program or operating system — when all of these will soon be obsolete concepts.

But now we're entering the Bronze age. We're in the midst of a great upheaval centered around the meaning of what we're doing. The question is, do we have the ability to conceptualize what we really want to do with the power that is coming?

I think that the leading edge is the extension of reality. A lot of people talk about artificial realities, but I consider that to be a semantic miscalculation because if you convince somebody that something is real, then it's real. It doesn't have to be qualified as chocolate reality, vanilla reality. It's as real for you as you perceive it to be.

***When the only tool you have is a hammer,
every problem looks like a nail.***

Reality is extended in two ways. One is extension by propagation. Once we had the hammer, we could build other tools with it. The computer extends our reality by propagation because it allows us to look at things that we normally wouldn't see — CAT scans are an example — and, therefore, accept them as reality. It allows us to visualize microcosms and macrocosms, to filter data down to something that our individual consciousnesses can absorb.

The other extension of reality is by revelation. The hammer revealed the sculpture within the stone; chipping away everything which was not David. It allowed us to discover something within that formlessness by applying a technique peculiar to the hammer. The computer has its own peculiar strengths. We can sit down in front of the screen and visualize things that are utterly unreal, fully convincingly. We can create virtual realities with the computer and explore them to the extent of our understanding.

We can tell we are only at the nexus between the Stone Age and the Bronze Age of computers: we have all the hallmarks of immature technology. Firstly, computers are not ubiquitous. The reality of this technology doesn't become assimilated until it becomes commonplace. We must have high-bandwidth data transmission as a given in everyone's life. Secondly, there is a tendency to identify computing power with the hardware, which is absurd since the hardware will change. Ideally, we want to be able to design things that are able to take advantage of whatever hardware capabilities become available.

Then there's the software hangup. Software is hobbled by the restrictive limitations of current hardware — display resolution, speed, memory, where are we going to get our D-RAM chips, etc.

Another problem is the myth of special knowledge — the illusion that to be adequate you must be able to program a computer down on the bit level. I think that's the hacker's version of machismo, like being a survivalist living in a tent, running deer down and biting them in the neck — that sort of thing.

And finally, to mix in the hammer metaphor, you have to attach the handle, that which tweaks a rock into a superior tool. The handle, in the case of computers, is the mind. As long as programmers keep their heads deep down in the machine, designing that spread sheet or that next release, there's not much time given to developing the handle.

Let's get down to some hard facts about what we should expect computer-based extensions of reality to become. Obviously we want them to map to the bandwidth of the human sensorium, as we understand that to be. The picture must be better than 30 frames a second of twenty-four color bits with, maybe, a four thousand by four thousand pixel display. Eventually, display resolution will overtake human resolvability — and granularity will disappear. The same holds true for sound, with the ongoing development of techniques like digital sound. Then there are other senses that we haven't even accounted for. God knows, you may have to stick your tongue in something. Use your imagination. One can easily imagine other senses being involved even at the level of input. There is a vocabulary of scents. Someone might find themselves actually programming smells.

What is going to inhabit this realm, this extended, on-the-other-side-of-the-wall aspect of reality that will become available to us when computing power reaches full sensory bandwidth? What we now refer to as data and information

will become more specific. We don't wake up and think, "time to eat the world of data." Wrong. We don't take in the realm of human activities like some smooth putty of data. It's modular. . . "I'm going to go to my job where I'm going to do this thing and that. Then I'm going to go eat lunch . . ." The rung that we're reaching for right now is object systems. We need to move into the world of object programming.

What makes all this interesting is the idea of inventing new art forms along with new types of symbolic language — new methods of communication, new areas of things to communicate. One project is perhaps to model the Glass Bead Game, from Hermann Hesse's last book. The Glass Bead Game essentially is played by creating intellectual syntheses of music and art and poetry, puns in different languages. It's this enormous mind game that would be played on a computer, under some kind of arena circumstances. And it could be the next phase of human exploration.

that's hacker's machismo — like being a survivalist living in a tent, running deer down and biting them in the neck.

Finally this gets down to my real point, which is the whole connectivity issue. You're going to have that fiber optic line into your house, and all of the computing power you can possibly use, as a completely embedded continuous part of your life. When you sit at the computer, you're not sitting down to productivity and the time clock. You are hooked into everything, with the potential to evolve yourself and the planet by way of a new mechanism that we don't yet fully understand.

Probably what you will see first, in all of these realms, is the equivalent of 976 numbers . . . chitchat and scams . . . or saying the love mantra forever. It may be a little rough for a while. People will do Stone-Age stuff with it. Hammer everything in sight. But then things might get really interesting. ▲

Todd's latest album Nearly Human was recently previewed at Fantasy Records in Berkeley. Sixty-six Bay Area musicians played on the album — and recorded it live in the studio "just like Frank used to do."

The album has a sumptuous sound to it culminating in the extended gospel-like anthem "I Love My Life." Todd generated the cover art work on Pixar and is so enamoured of Pixar he wants Warners to buy one.

Todd's now off to Japan where he's producing two cuts on a new album by Pakano — an artist described as equal parts of Tracy Chapman and Suzanne Vega with a satsuma glaze. Todd's timing his July tour of the East Coast to finish in Boston on the first day of the Sigraph convention.

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Durk Pearson and Sandy Shaw

interviewed by Jude Milhon

*One of the master themes of cyberpunk is the extension of human possibilities by drugs and surgery. Durk and Sandy have been pressing the vanguard of this movement since the publication of their book *Life Extension* in 1982. They have mined the scientific literature, hacking their way through citation indexes and setting abroad their findings. They are pioneers in radical body work: better and longer living through chemistry, chemistry lovingly researched and imaginatively applied. They are in the noble tradition of self-experimenters — from the early homeopaths to J.B.S. Haldane. Self-experimentation is not yet regarded as a personal right — of course, conversely, neither is suicide. But self-experimentation to defeat aging and death may be worth the gamble — considering the alternative.*

*These two want to talk about saving one's **skin**, not merely figuratively. They also want to talk about **aphrodisiacs**, and how to make optimal use of one's **neurotransmitters**. And they have uncovered the research coverup of the decade: *The Immortals Are Amongst Us Now* — only they're mice.*

Durk and Sandy are lounging on their beds in a Union Square hotel room. They are magnificently casual in modified combat gear. I artfully dishevel my bandana headband and thank God my camou jumpsuit came back from the cleaners.

SAVING YOUR OWN SKIN

SANDY SHAW: What's that button on you — that symbol?

MONDO 2000: It means radioactive: danger sign!

DURK PEARSON: Well, the potassium-40 in the human body, if it were in a mouse, in a lot of states the mouse would have to be disposed of as hazardous radioactive waste.

SS: Of course, they don't worry about human radioactivity; they assume it's natural.

M2: Yeah, natural! What a concept. Tell me what could be more natural than dying in agony.

DP: Yes, or crinkling all up beforehand? Right now we're excited about something we've made to erase the — uh, visible signs of aging on the body: facial lines and furrows, and scars, acne scars. . .

SS: I had some acne scars, up until a month ago. . . it's amazing. He has this incredibly huge scar. . .

DP: Yeah. A particle-beam power supply tried to send me to Valhalla; 13,000 volts through my arm. I got this scar nearly twenty years ago. (*He's earnestly rolling up his right sleeve.*) I mean REALLY UGLY.

M2: Urrrghhh — don't bother. No, really — I can imagine . . . Oh. Okay . . . that's not bad at all.

SS: It's gone away more in the past three weeks than in the past ten years.

M2: So what happened three weeks ago?

DP: It was really after *The Dead Pool*. We've been doing things to keep our insides young since 1968, of course, but at the cast-and-crew showing of *Dead Pool*, when I saw how noticeable the lines in my face were — I decided, hey!, I'm

just not going to put up with this any more. I got a bottle of lactic acid and started working with it. You know, it's much more difficult to do a cosmetic than a nutrient supplement. You have to worry about how it rubs out, what it smells like, what it tastes like when somebody kisses you. . .

SS: We did literally hundreds of experiments on our own hides. I would have a spot of this type here and that there and charts of the different spots. . .

DP: What you see when you look at your skin is really a bunch of dead cells, called the stratum corneum. The only time you see live skin is when you get a scrape — you know you've hit live skin because it bleeds. As you get older, your skin gets thicker because it takes longer for the cells created in the basal layer to get shed at the surface, so your skin looks more old and beat up because it is. Also, as the skin gets thicker, it's more likely to crease. Wrap a piece of paper around a pencil and it will curl. You try a piece of cardboard, it will buckle, and crease. If you reduce the thickness of that dead outer layer back to what you had as a child, you will see the wrinkle — er — the creases going away. They will, in the allowed words of the FDA, be smoothed.

SS: And if you should use that W-word, please make it clear — we did not say that!!

DP: We never use the W-word. Furthermore our lawyers say we can't even say that we even said we couldn't use the W-word.

M2: Huh? Right . . . what does the FDA want?

SS: Uh, that's a question! . . . Well, the FDA allows talking about smoothing lines, whatever the fuck that's supposed to mean.



DP: Even though you will find no mention of w's in any medical text or reference book, either as symptom, sign or diagnosis, much less any treatment for w's, if you even mention w's the FDA says your product is a drug.

Now, I had three big ones in my forehead. The top one is gone. The middle one is almost invisible. The bottom one is less than what the middle one was . . .

SS: Let's face it. Everybody calls them w's.

DP: Furrows. Creases. Nasolabial folds. Grrrrrrhhh . . . Lines!

SS: But you *can* talk about looking younger. It's crazy!

DP: Right. See . . . around my eyes there're a lot less than there were. Just take a look at me in the *Dead Pool* and you'll see . . . There's really a very long history for this stuff.

Remember Cleopatra's milk baths? Since they didn't have refrigeration it was almost certainly sour milk. That contains lactic acid, which is an alpha-hydroxy acid.

M2: Which is a peeler, of course.

DP: Well, it's a peeler if you use it in high concentrations. But concentrations that cause a peel aren't as safe. 5% is plenty for anything except maybe to remove a wart. And even then, some warts will go away with 5%.

M2: So at 5% what you are actually doing is dissolving some of the stratum . . .

DP: Well, what you're doing, you are loosening the bonds within it so it gets shed normally. If you use a white wash cloth you'll find it's a lot dirtier because the dead skin is coming off. You'll also find, after using this for ten days or so, that you are squeaking. Do you remember as a kid when your skin was wet it would squeak? Well, now you've got such a thick layer of dead skin, it gets slimy when it gets wet; you get rid of that old dead slime and you'll squeak again. You'll be squeaky clean.

M2: So what's in this bottle?

DP: There's a bunch of different compounds at work here. First, don't forget the lactic acid. Sour milk and yoghurt . . . yoghurt facials . . . you've heard about them? They work slowly because there isn't that much lactic acid in there. You walk around all day with yoghurt on your face. Who wants to do that? Yoghurt on your face all the time! There are other alpha-hydroxy acids, too. The ladies in the court of Louis XIV used old wine on their faces — malic acid and tartaric acid. We have an 1892 *Scientific American Cyclopedia of Receipts* (they called them receipts, not recipes) — with twenty formulas using citric acid, tartaric acid and lactic acid for removing the w's, getting rid of smallpox scars, sunburn, damaged skin, pimples . . .

SS: The incredible thing is, that since nobody knew how this stuff worked, it never became accepted in medical practice.

DP: Back around 1974, Dr. Van Scott, a dermatologist, started using 5% solutions of the different alpha-hydroxy acids, sometimes neutralized with ammonia to a reasonable pH. He found that it worked remarkably well.

M2: Even neutralized?

SS: Oh, yeah. It doesn't have to be acid. In fact, if it's acid it doesn't work any better and it's a lot more irritating.

DP: Then in 1984, Van Scott had a real brainstorm: whether

you had a callus or ichthyosis or acne scars, it was all hyperkeratinization. That is, the dead cells in the stratum corneum were stuck together too hard, too thick. Anything that would reverse this would treat all of these things. Van Scott made an error, though. He thought what held cells together in the stratum corneum were ionic bonds. That's what holds salt crystals together; if they were ionic you could wash your stratum corneum right off.

M2: Humans do need waterproof skin.

DP: So they're not ionic. They're Schiff base bonds and disulphide bonds. The sulphide bonds are very important: they are a major factor in controlling the structure of keratin. Whether your hair is curly or straight is determined by the number and position of disulphide bonds.

M2: Right. If a hair is mashed flat by tight bonds, it's curly, and if the hair is circular in cross-section it's straight.

DP: When you either straighten or permanent-wave the hair, you're breaking and re-forming those sulphide bonds. Well, if you use what straightens the hair in a few minutes, but at much lower concentrations over a period of a few days, you can straighten out the skin so the w's go away.

M2: This is brilliant: a skin straightener for kinked skin!

DP: That's right. Once you realize that, it makes sense that the Romans used a sulphur-containing ointment for w's.



M2: *(I am now used to hearing "w's." I, too, would be profoundly shocked to hear someone pronounce the W-word.)*

DP: Of course, they had problems: the chemical reaction produces hydrogen sulphide. You stink like rotten eggs. That's worse than having yoghurt on your face all day.

SS: There's also an ingredient that is a food additive, used in baking bread. It repairs damage to skin and hair — it's incredible. We've got photo-micrographs of hairs that have been damaged. Hair looks like a rubber hose with fibres running lengthwise. When it's damaged you get these pieces of broken fibers hanging out.

M2: *(A strand of teased-and-spiked barbed wire flashes painfully in my mind's eye.)*



ROBERT PRUZAN

SS: With this material, the hairs go back to looking completely normal. This isn't temporary — it's a permanent repair. The same thing happens to skin because it's chemically very similar.

DP: You can get the hair repair from VRP. It's called our *Living Hair System*. We've been using this on our own hair for fifteen years now.

CHEMICALS AND NUTRIENTS FOR PERSONAL ENHANCEMENT

M2: My chief wanted me to ask about intelligence-increasing agents. What about vasopressin and other



memory enhancers? I wondered whether oxytocin (*a nearly identical hormone that affects smooth muscle in the reproductive system*) might have a similar use. It would be sweet: good memory and earthquake orgasms. Of course, changing one amino acid...

DP: ... makes a big difference! The papers I've seen don't show any memory improvement with oxytocin. It does a better job of intensifying orgasms, though.

M2: Right! Nine times better than vasopressin, according to *Ganong's Physiology*...

DP: Ah, listen: they have identified a five-amino acid peptide, part of a gonadotropin-releasing hormone, which affects sexual behavior in experimental mammals. Oxytocin and vasopressin are octapeptides; this is a pentapeptide. It should be cheaper to make and it should be absorbed very well. It definitely affects behavior.

M2: They all start humping like crazy.

SS: The big problem is the FDA. A drug that has aphrodisiac side effects, like L-dopa, actually has more trouble getting past the FDA than a carcinogen.

DP: The guy that developed L-dopa therapy for Parkinsonism told us this himself. The only effective help for patients was delayed for years.

SS: Phenylalanine and other noradrenergic agents are good for memory. Agonists for the noradrenergic, serotonergic, and dopaminergic neurosystems. They all enhance memory and improve intellectual performance.

M2: They act like stimulants. What if you take artificial stimulants?

DP: That's interesting. The person who uses a phenylalanine supplement will be able to get more effects from less stimulant. There's a neurotransmitter-inducing effect, but you can make more neurotransmitter easier, so you won't become desensitized and messed up. Neurotransmitter precursors are being used for detox for cocaine users now, too — to help get the neurotransmitters back up to normal levels quicker.

A drug that has aphrodisiac side effects ... has more trouble getting past the FDA than a carcinogen.

SS: You should try some of our *Rise & Shine* — that's the phenylalanine-plus-cofactors supplement. Guess what? We've now got a caffeine and phenylalanine supplement that's called *Blast*. You blast your way out of bed in the morning.

DP: It is much smoother than caffeine alone. You don't get the jitters when you're coming down. You don't get the spacey feeling. It's such a smoother trip than the straight caffeine.

M2: That's interesting. Does it protract the effects? What's the usual caffeine ride — about 45 minutes?

DP: This extends it out to two, three, four hours. It really changes the experience utterly.

SS: The *Blast* is a super upper. Basically with nutrient supplements you've got natural uppers and natural downers. You can just fine-tune where your head is at.

DP: In the ultimate analysis every known psychoactive drug works by imitating some natural neurotransmitter or influencing the way one works. You know, one of the things which you definitely ought to subscribe to — I've got a copy right here . . .

SS: We calculated one time that there are papers totalling 50,000 pages published every year on this subject.

DP: This is the one you want: *Psycho-Biochemistry* — expensive but worth every cent! You'll find drugs to have fun with years before anyone else knows about them!

M2: Oh, thank you. This is lovely! Is it a government publication, then?

DP: No. It's from Chem Abstracts — The American Chemical Society.

M2: I've been hearing about a long-acting speed-like drug called Uforia. Do you have any inside dope on Uforia?

DP: Yeah. If anyone is going to use that I'd strongly recommend that they pre-treat themselves with Deprenyl and start with 1/10 of the normal dose of the Uforia and

work their way up. Because in animal experiments you get the same type of free-radical damage that you get with MPTP. It's not in the same part of the brain; it's not going to cause Parkinsonism, but it does seem to cause damage to the dopaminergic nervous system.

M2: Ngah. How reversible is that?

DP: Unknown. But the thing is that the damage is blockable with Deprenyl. It's caused by the monoamine oxidase-B, and Deprenyl is a specific B-inhibitor. That makes such drugs more potent, so people should start out with much lower doses and check their blood pressure just to make sure nothing funny is happening.

SS: You have to order it from England or Hungary. It's a prescription drug available from Britannia Pharmaceutical. It's called Eldepryl in England.

DP: And the best thing you can do for someone with Parkinsonism is to get them a big bag of the stuff.

Incidentally, it is a potent aphrodisiac. Deprenyl will really horn you up.

SS: We've got a copy of a paper titled, "Sluggish Old Rats and the Aphrodisiac Effect of Deprenyl." It's incredible, but these senescent rats become as sexually active as young rats.

DP: You do have to be careful about blood and urine tests, though. Methamphetamine is one of the metabolites, although the "up" effects of methamphetamine are blocked by the drug's activity. When you take people off the stuff they don't get the depression of amphetamine withdrawal — but if they're Parkinsonian they'll rapidly become symptomatic again.

SS: Interesting work is being done behind the Iron Curtain. Polish scientists are studying dominance and submission.

They would pair rats two to a cage with a bottle of sweetened milk. In 85% of the cases a hierarchy developed — the dominant rat owned the milk and the submissive rat didn't even try for it. They found that when they gave Clonidine, a high blood-pressure med, to the dominant rats, the dominance-submission behavior disappeared entirely.

M2: How to subvert the primate wired-in hierarchical shit!

DP: That's precisely it. The Poles may figure: "Well, we can't kill the Russkies, but the big cheeses that are making the regulations all have cardiovascular disease and Clonidine is extremely effective for cardiovascular disease . . . Heh heh heh . . ."

SS: And, oh — good news! Researchers have found some more opiate receptors.

DP: One of them, the sigma receptor, is dissociative in nature. It acts like Ketamine or PCP or hypnosis in the way it causes analgesia. The pain is there but it's not happening to you. It's over there somewhere. Detachment. The pain doesn't hurt.

SS: I'm just waiting for someone to attack the whole drug testing thing by drinking a lot of cow's milk. Two quarts of milk contain about 1/10 of a therapeutic dose of morphine.

DP: Yeah. Not endorphins, but morphine, real morphine. Some is in the alfalfa that they eat, but cows apparently make it in their livers.

SS: Those contented cows . . . they're full of morphine! The American Dairy Council is the top-dollar lobby in the country. If they perceive drug testing as a threat to milk consumption, that will be the end of drug-testing.

DP: And what about the coffee lobby? There have been two papers published on opiate agonists found in coffee. Even decaffeinated coffee. People get hooked on decaffeinated coffee because it's not been de-opiated.

SS: And then there's the green menace: lettuce. Soldiers in the civil war used lettuce opium as a pain-killer . . .

DP: You let lettuce go to seed and then you slash the stem just like you would an opium poppy. It smelled like opium and just breathing the fumes would put you to sleep and kill pain . . .

SS: Hey, maybe people will just start growing their own painkillers! Lettuce everywhere. Lettuce-spotting from helicopters!

. . . rumors about six-year-old mice at NIA." . . . this is the most important piece of information on aging in the past two decades.

THE NIA'S SECRET SUPERMICE

DP: At a seminar put on by the National Institute of Aging we saw Schneider, the head of the Institute. One of the scientists — this wasn't open to the public — one said, "I've heard rumors about six-year-old mice at NIA." Schneider said, "That's not a rumor. We've got 'em. We've got some up to eight years old." The scientist asked, "How did you do that?" and Schneider said, "We didn't do anything. These are mice that are being fed regular lab chow, in normal amounts. And they're all ear-notched. There is no way that they can be mixed up. They're really that old."

So I asked him roughly what numbers were dying at each age. It was a regular Poisson distribution. It was what you'd expect if the chance of dying were independent of the animal's age. I asked where I could read about this, and he said, "It hasn't been published. It won't be published." He added, "Because we don't know what it means." Then I lost my temper and very sweetly said, "Well, in science, when one doesn't know what something means, one publishes it in the hope that someone else can figure it out." He got red and turned to somebody else.

You see, this is the most important piece of information on aging in the past two decades. What it means is that maximum species life span, at least in mice — I don't know whether it's so in other species — may be a statistical artifact due to small numbers. If you've got a colony of two hundred mice, you can't have half a mouse left alive. But if you've got a colony of 45,000 mice, after a while there's dozens of the damned things living on and on.

M2: When these older mice die, do they get autopsied?

DP: Yes, but I wasn't able to get any data on that.

M2: What about freedom of information? This is publicly funded research —

DP: There were no reports. You can't demand a report that hasn't been written.

M2: Earlier today I was saying, if Progeria is on one end of the Bell Curve, what's on the other end?"

DP: Eight-year-old mice. And an eight-year old mouse is like a 400-year-old human! ▲

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HURTLING TOWARDS THE SINGULARITY

Vernor Vinge
interviewed by Michael Synergy

Cyberpunk conjures up a wealth of abstract images. This image-realm is what Gibson calls the Matrix and falls under the generic head of Cyberspace. But Gibson wasn't there first.

The inspiration to all of us in the computer underground was the novella *True Names* by Vernor Vinge (pronounced Vin-gee). As a Ph.D. in Mathematics and a professor at San Diego State University, Vinge has more than a passing acquaintance with the technical details of "what it will take" to achieve Artificial Intelligence and Intelligence Amplification. Vernor has published *Tatja Grimm's World*, *The Witling*, *The Peace War*, the *Prometheus Award* winning *Marooned in Realtime*, *True Names* and *Other Dangers*, and his current collection, *Threats and Other Promises*.

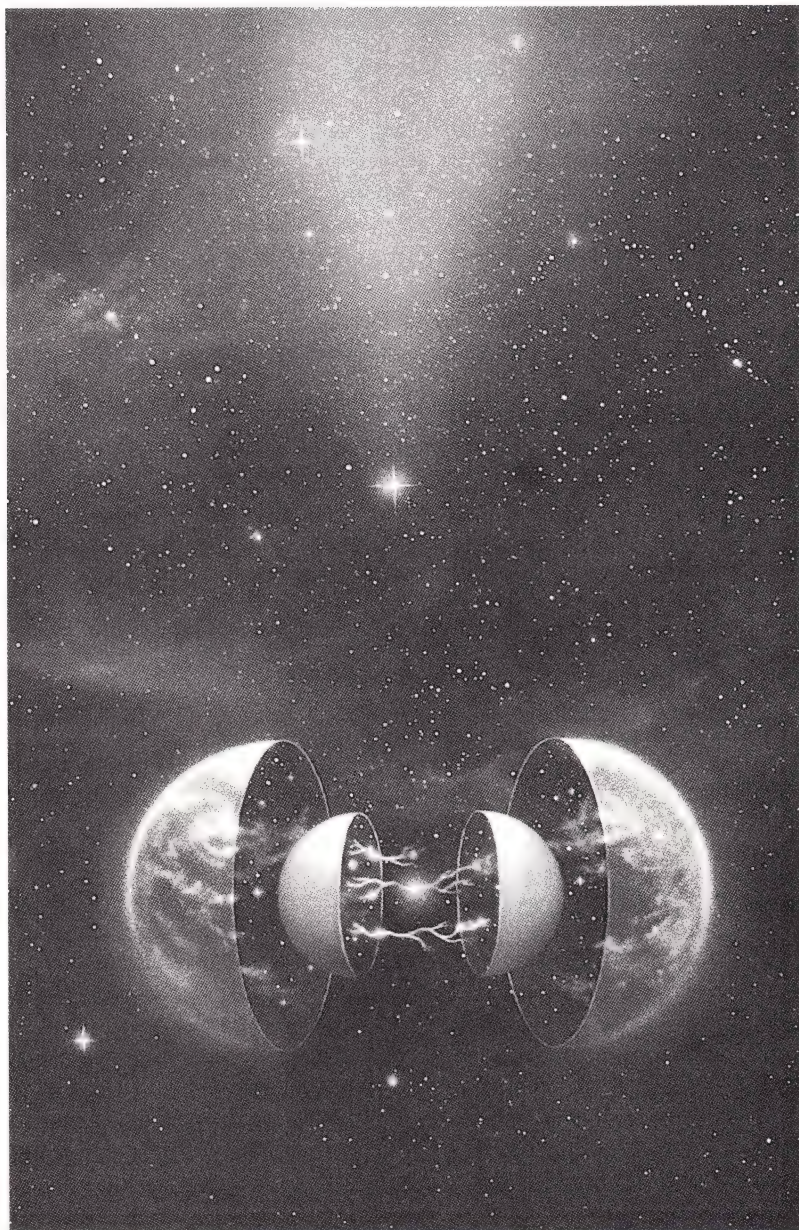
Pivotal to Vernor's cosmology is the notion of "asymptotic time." Time is not a constant — it accelerates as it approaches its asymptote, a point Vernor calls the "Singularity." As we hurtle towards this point in time, the "Weirdness" begins. Vernor has a vision of what looms ahead when he makes hard science extrapolations of current trends: "It's a problem we face every time we consider the creation of intelligences greater than our own. When this happens, human history will have reached a kind of Singularity — a place where extrapolation breaks down and new models must be applied — and the world will pass beyond our understanding."

Vinge's world in *True Names* has computer pranksters in covens operating in *The Other Plane* pulling off capers which would make a state-of-the-art cyberpunk joyous. The spirit which Vernor brings to his craft is summed up in the *True Names* introduction: "The best we writers can do is creep up on the Singularity, and hang ten at its edge."

—Michael Synergy

MONDO 2000: Do you consider yourself part of the cyberpunk movement at all?

VERNOR VINGE: Definitions of something like this tend to be very nebulous. You have a coined word and a number of people with their own definitions. So it's probably a matter of individual opinion. I certainly don't think of myself as a cyberpunk writer. A couple of months ago, I was asked whether I thought *True Names* was cyberpunk. I wrote a note that appeared in *Science Fiction Lovers*. Let me just read that to you: "I think there's a large set of tech ideas that *True Names* shares with cyberpunk stories. I also see two substantial differences between *True Names* and the stories that are usually called 'cyberpunk.' One: cyberpunk shows more of future society's ugly underbelly. In some cases this is simply hardboiled style. In some cases, it captures the pain of very fast social change. Two: cyberpunk is often pessimistic about the possibility of social and technological



WOLFGANG GERSCH

**One way or another we are going to get superhumanly intelligent creatures.
It would be nice if we could be participants.**

change, which may in fact be a wonderfully *good* thing.

M2: I accept that. My understanding of your interest in biocybernetics is that you emphasize the interface between humans and machinery. That's something I'm looking forward to.

VV: Ah yes, so am I. One way or another we are going to get superhumanly intelligent creatures. It would be nice if we could be participants. I think the general improvement of interfaces is a path towards that.

M2: What are your thoughts on improving the interface? Which direction do you think that should move in?

VV: I'll bet you that I don't have any startlingly new ideas. Real voice recognition or the cyberhelmet (a combination of small video screens just in front of the eyes with the VPL Dataglove and the 3Space Headtracker) would be positive improvements. Have you seen the Amiga schemes where you have a television camera that is watching the human and it converts his room into a control panel? That's a pretty neat idea. I regard it all as occurring fairly gradually. In the longer run, I think that we are going to have to get direct interfaces or risk being supplanted by outright machine AI's.

M2: It boils down to virtual realities. That's what Gibson's cyberspace is. My biggest gripe with *Neuromancer* is the positing of data constructs that are absolutes. If you and I were both "jacked in," we'd see the data constructs as the exact same thing. We'd both be recognizing the Bank of America databank, for instance. Whereas, the idea in your work seems to be that each and every person will see what they want to see, based on individual psychological makeups. People are going to interpret data in drastically different ways. You represented that as the Other Plane in *True Names*.

VV: In *True Names*, one of the important points was that the bandwidth of participation was quite narrow, about fifty kilobits per second. At those levels, there really had to be visualization due to a need for processing at the destination. So I think in *True Names*, what you are saying was definitely the case. You can imagine a situation where there are simulations using certain standard icons. Actually, that's the easiest to imagine right now because we are used to seeing standard icons. So it depends on the background. I don't think either scenario is a turn off. There's the ultimate point that none of us really know what anybody else views. I don't really know what an airplane looks like to you. So it's a question that, even with present day technology, is unanswerable.

M2: True. Well, with Gibson, you pick up your deck and immediately jack in. And you're able to bounce around cyberspace and handle everything. I think that the reality will be a much more slippery approach where each person will have to write custom software to deal with the Matrix or other realities of this type. I had a very hard time with Case in *Neuromancer* operating in cyberspace, which must

have a tremendous throughput rate, and typing as well. All the software would be custom and pre-written, otherwise you couldn't react in time.

VV: I could see it happening either way. I don't see anything fundamentally impractical about either way. It depends on the background parameters, like the bandwidth being used. I *do* think that there will be a lot of customization. The customization that you see right now is just a small taste of things to come. Ten or fifteen years into the future, if you somehow kidnapped somebody's personal computer, you could have a fairly hard time getting past the customization. There was an item in *Risk Management* on the Usenet last month about how the Feds confiscated this guy's home computer system, a CP/M machine, mainly customized. They tried to get a court order directing the guy that they confiscated it from to tell them how to use it. The judge told them that they would have to figure out how to use it themselves.

M2: Tell me about the background to the creation of *True Names*.

VV: That story came together in pieces. The notion of *True Names* . . . I have a note in my idea box from 1971. I had just read Ursula LeGuin's *Wizard of Earthsea* and true names are a big deal in that story. It occurred to me that a true name is like a serial number in a large database. If you had a database that described all the objects in your universe in a sort of abstract way, you would have power over those objects.

M2: In the introduction, you mention that you were contacted by a computer hacker while sitting there at your screen and you made up a handle on the spot. You said that this seemed to you to be completely other-dimensional. It was completely new to you.

VV: I suddenly realized that, by the standards of my youth, I was living in a science fiction story.

M2: We always feel that way around here.

VV: Things are changing so fast now that I think that a lot of people have that feeling.

M2: Feels like a William Burroughs novel at times. Did you ever have much involvement with the computer hackers set? Your work is an inspiration for a lot of hackers, as well as people like Roger Gregory and Mark Miller at Project Xanadu.

VV: Let's see, when I wrote *True Names*, my only contact with computers was teaching. I had been teaching assembler language and some high level language stuff and was still in a transitional stage. So I had plenty of exposure to computers, but I hadn't any real exposure to any of the subcultures.

Since then, I've had some exposure — mostly through going to science fiction conventions and chatting with people. I was interviewed on CompuServe, one of their live interviews in the early 80's. So I was floating around on

CompuServe for a while. That was interesting. I enjoyed the notion of interactive games, where each participant is typing things in and trying to make the plot go their way. I've always been interested in measures and counter-measures. As I said in *True Names and Other Dangers*, I never had any contact with computers whatsoever until the early 70's. In retrospect, it was probably just as well. I don't think a person can learn a lot about where things are going by looking at an IBM 1130 with a card reader.

M2: What do you think of computer viruses? They're my specialty, and I'm curious about your views.

VV: I think Hans Moravec has a good idea. His attitude about the general future of viruses is that it's going to be very much like a real ecosystem. In other words, shutting them down entirely is unrealistic, just like it's unrealistic to talk about a world without biological viruses. If you think about the size of the machines and the size and complexity of nets and the software, I think it's a very plausible idea. So, Moravec's notion is we eventually get into a situation where it's more or less like immune systems and disease control right now.

M2: Your work often involves the notion of Singularities. This seems to be important to you. Can you define this?

VV: When a race succeeds in making creatures that are smarter than it is, then all the rules are changed. And from the standpoint of that race, you've gone through a Singularity. That's because it's not possible before that point to talk meaningfully about the issues that are important *after* that point.

I've had this idea, without having the word for it, since around 1960. I think a lot of people have had this notion, this sense that *someday* it was going to happen. I think we're beginning to realize that *someday* is really close. Von Neumann appeared to have a similar notion, so the idea has really been around for a long time. It's a case of something becoming more and more obvious until it kind of looms over everything. As science fiction people, we talk about interplanetary travel, interstellar travel, this and that. This other event, the occurrence of this Singularity, will make all of this stuff we've been talking about kind of meaningless.

So I have found a big barrier in writing hard science fiction. When I try to do a hard science fiction extrapolation, I run out of humanity quickly. I've been thinking about this quite a bit and I think I do have a future history that will allow for the Singularity and still have humans around or human-equivalent things around. I have a collection that came out in November, *Threats and Other Promises*. It has a novelette in it that is the opening shot in a future history that I hope will let me be moderately realistic. It has one

potentially unrealistic assumption, but otherwise it's more or less realistic.

M2: What are your thoughts on the augmentation of humans with computers? Somewhere in the very near future, changes are going to be coming so quickly, particularly when we're hooked up to immensely powerful computers and we're solving problems at a rate that no one's ever solved them before. The change is going to be more than people can handle.

VV: Yes. Everybody, in their own vocabulary, is describing this strange thing that we see ahead of us. You push this just a little bit farther and you don't have humans running around as the true actors any more. If you do create creatures that are smarter than you, they become the principal actors.

M2: At the end of *True Names*, it's implied that one of the main characters, Ery, will live on an awfully long time as an AI. I'm wondering if you would continue on from that point and write a story in which the point-of-view is an AI?

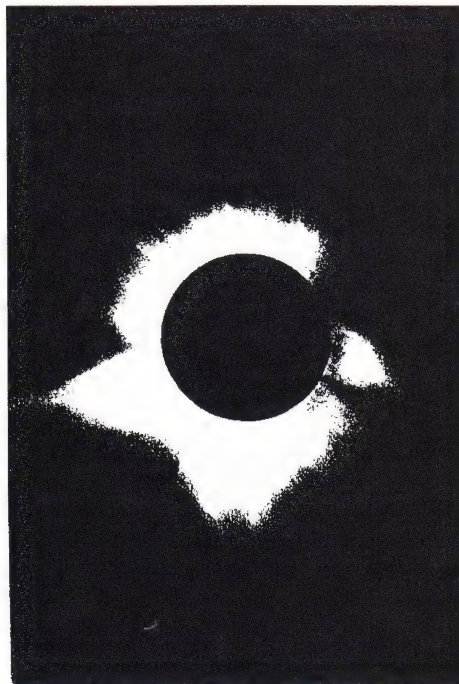
VV: I may have some AI's in stories. As far as superhuman AI's, as an author I have to handle them very carefully, because if they want you to think you understand them, they can do that. But that would be a fraud. If a superhuman sits down with you, and you walk away thinking you understand it, you've been sold a bill of goods. So from the standpoint of writing a story, it's got to be kind of cryptic at best. I personally do not think that super-human creatures would be as malicious towards us as we are towards animals.

M2: Oddly, the people working at the cutting edge of AI tend to be anarchists. So this will, in a sense, be the role model for AI's. If there's to be any sort of imprinting on the AI, it's going to be the principle of non-coercion and things like that.

VV: What does the average anarchist think about animal rights? I doubt if most anarchists have much sympathy for the notion of animal rights. If you look at it that way, in thinking about superhuman intelligences, it's not *a priori* clear that just because they were set up by good guys, they would treat us real nice. I personally think that there is some reason to believe that we'd be OK unless we got in their way. If we got in their way, whether they'd rub us out or use some other solution would probably depend on the expense.

I have a friend, who should remain nameless, who has worked at the edge of this stuff for a long time. He sat back once and said, "You know, if this stuff were going to happen in a thousand years, I could regard it with fond equanimity. But happening in ten or twenty years, it really makes me kind of nervous."

M2: So what is it going to be like in the future when we



have AI's and these sorts of individualistic humans? As you said, an extrapolation of current trends shows the end of human influence and the rise of cybernetic entities.

**When a race succeeds in making creatures
that are smarter than it is,
then you've gone through a Singularity.**

VV: I think actually, when I say I'm going to write these stories that still have human interstellar empires, I'm not saying that's the way I personally think. In fact, I had to think very hard and long to come up with such a possibility. I personally think, if we don't blow ourselves up that, in twenty to a hundred years, we will go through this technological Singularity. And that there may be humans afterwards — they will not be the principal players — and it's essentially impossible to talk about what's going on with them. So to me, that's the hard reality. The fact that I've come up with a future history that allows me to write stories that are otherwise, depends on making one particular assumption that is clearly made. And it's a concrete assumption, a very unlikely assumption in terms of the real world. So all of the writers, I think, who are thinking about these things — all of these visions are either apocalyptic, or they're saying, "We're not going to be able to talk in human terms for very much longer." If you look at the way *Schizmatrix* ended, and the way that *Neuromancer* ended, and the way you're telling me *Mona Lisa Overdrive* ended, and the way *Blood Music* ended — these are all, if not apocalyptic in the same way as *True Names*, *Marooned in Real Time* and *Peace War*, dealing with this same essential issue. So, I think that all writers who intend to write realistically are up against the same wall. And it is producing a lot of real neat stories. Real pyrotechnics. But there really are some limits there, until we actually fall through the Singularity, and then their art, presumably, can continue, but it would not be art that you or I, at this time, could understand.

M2: After talking to a few authors I noticed that they have a very negative view of the effects of technology on man and society, and they represent this view in their work, which has been encapsulated under the term 'cyberpunk.'

VV: There are two separate issues here. One is: progress that goes so fast that it causes physical and social dislocation. And then there's also the notion of writing stories that concentrate on the underside of society. Having progress go so fast that it causes dislocations is something that I would expect to see lots of stories about; it's essentially steam engine time. I don't know if you're familiar with that cliché . . .

M2: Charles Fort's "It steam engines when it's steam engine time." Everyone else has been using that, too . . .

VV: I think that's an accurate statement, though. There are two halves to it. One is whether or not you're interested in gritty realism. Even if a person weren't interested in that, you'd still get tired of it just because the notion of progress accelerates to a point where things can't hold together. The other aspect is more stylistic and literary. And I'm less qualified to talk about that, but I have a feeling that there is steam engine time there, also. It's going to be — well, I think

that the next twenty or thirty years are going to be very interesting. As we get closer to the Singularity. I think things are going to get discouraging and chaotic in terms of literature. One

great problem of science fiction is that story ideas and novelties take place in environments where, very often, the people or the society had decades to think about the ideas that the writer of the story probably had to think of in six months. And so this means that in many science fiction stories a great challenging insight into the problem that is facing society, if you really think about it, would have been thought of years ago. And, with the various stories that are being written now, by the time things really begin to tighten up, there's going to be a lot of parallax and a lot of insight into the nature of very fast progress. And it's going to be strange. There's one real neat book that came out way back in the early seventies, *The Coming of the Golden Age: A View of the End of Progress*.

M2: I haven't seen that one.

VV: By a microbiologist, I think at MIT, by the name of Gunther Stent. He makes the following two assumptions in writing this book; a) we will not make superhuman intelligences, and b) we will not get faster-than-light travel. But with those assumptions he reaches some very interesting conclusions. And one of them is the notion of art becoming more and more chaotic. And to me, I see this: I see things like this happening as you get closer to the Singularity, you get more sophisticated. You get to the point where you are re-working things, intellectually and artistically, and the very fact that you understand all the nuances of previous ways of doing things just causes what you do to have the appearance of being chaotic. If the Singularity happens late enough, this could be a very obnoxious and unsettling trend. If the Singularity happens soon enough, of course, all that happens is that artists are now operating at a higher level of intelligence. They're the equivalent of cave painters at the beginning of the human era, but they actually are doing new things for their level of intelligence. ▲

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Light Monks On

Mickey Hart interviewed by Faustin Bray

Meeting the Dalai Lama was easier than getting face to face with the drummer of the Grateful Dead. At last, surmounting all obstacles, we found ourselves in the inner sanctum of Fantasy Records where we bearded the surprisingly unpretentious, almost humble, Mickey Hart.

This article is a preview of things to come. Here we would like to introduce some basic ethnomusicological ideas, and the specific wonder of the Gyuto Monks. Next issue, our second Music & Consciousness issue, will focus more closely on the perceptions of a man who is world famous for being on time/keeping the beat.

MONDO 2000: The Monks are hot.

MICKEY HART: They are hot because they have upheld an ancient tradition for over 500 years and they are here now, the third time out of monastic seclusion in 450 years. I don't know when they will come again; this is a rare thing we have here. We should take advantage of opportunities for enlightenment — to lighten up.

M2: How does this fit with your being the Dead drummer?

MH: Well, we are in the same business — *transportation*. They do it differently, but they have a groove and so do we. I guess that is the link — they move minds, we move minds.

M2: So you have picked up on this specific transformational music from Tibet and you are representing it this year in the West?

MH: Basically, the Grateful Dead family and Richard Gere/The Tibet House are co-sponsoring the monks on

this tour. As exiles, they may never get back to Tibet, so they want to use the earnings from this tour to build a monastery in Nepal where people can study. The Dalai Lama wants them to bring the Dharma out, and that is what they are doing. It is not a religious or political trip for me. It is mostly vibration; it makes me feel good. The sound is right, the extended voice is very rare. There are a few cultures like the Hoomis, the Mongolians, the Inuit. . .

M2: Tuvan?

MH: Yes, there are some extended voice situations, but this is unique.

M2: They use the lowest vocal ranges that we have heard. My first experience with the sound was at Bill Sterling's house in the late sixties. Coincidentally, he and his wife, Yvonne Rand, hosted them in their home this time — a twenty year continuity there. That was Huston Smith's recording I believe. That recording is a fundraiser for them, too.

MH: Huston Smith went over to study theology — this is Huston's story to me: He woke up in the morning and heard chanting. He looked over his balcony and saw about 140 monks chanting and suddenly they all stopped but one; he alone sang the whole chord. At that point Huston fell to his knees and said, "*This is why I'm here.*" From then on he studied them. He recorded them and brought the recording to MIT to analyze on the computer. Huston is the godfather of all this because we knew nothing of multiphonic singing until then. Not only that, but they are real light, and it makes you feel light. I call them "Light Monks on Hope." It makes you feel there is somebody in the world working on peace constantly — all the time they're trying to make a better world, and anybody who will do that, I'll give them some of my time.

The Gyuto Chanting tradition is a piece of Tibetan Buddhism. There are two types of Tibetan chanting in two different monasteries: one is the Bon, and the other is the Gyuto. The monks practice for twenty years to have the ability to hold three notes simultaneously: the root, the third, and the fifth, with occasional partials. They resonate their low note in seventy cycles, quite low in the human perception of vocal range, and then they manipulate the sound by certain kinds of tension which build a harmonic pattern in the resonating cavities of the head. It is the coming and going of the harmonic resonances that makes for the overall chant. They chant slightly obfuscated Sanskrit text for hours in a trance



FAUSTIN BRAY

Hope



state, emptying their bodies of all their thoughts and replenishing them with new, positive, uplifting, peaceful thoughts. They're working, making a better universe every day — transformation. They invite their deities to come down and speak with them and then go away to do their bidding.

M2: How many monks are touring this time?

MH: There are twenty-one of them, twice as many as last time. The voices are rich. Don Pearson, at Ultrasound, Dan Healey and I, have developed a system for miking them with very discreet headsets, so it sounds like you are in their throats. We knew from the last time they were here that this performance was the hardest thing in the world to assist sonically because you have delicate voices, loud cymbals, drums, conch shells, skull drums and thighbone trumpets, all in the same space. With the headset, we can turn it up to 120 dB (decibels). I asked them how they like to hear their voices when we were in the studio; it was close to 118-119 dB when they acknowledged that that was the way they heard it in their



We've developed a system for miking them so it sounds like you are in their throats.

heads. The Monks like it loud. They feel the way the Grateful Dead felt when we first heard and felt the power of finely tuned PA systems. They can sculpt the moving air, their own soundscape, and their own sound arena. This is bringing the Monks into the 20th century.

M2: Cybermonks!

MH: They're playing in New York at St. John the Divine before going back to India.

M2: That is where David Hykes and the Harmonic Society are in residence.

MH: Is he there now? In your article I saw that he understood who the Gyuto were.

M2: He apparently studied around them. He will probably make an effort to get to New York for the Monks. We saw some chanting Monks when the Butanese dancers performed here.

MH: They had a couple of mercenary monks there. I heard they were great.

M2: Those hats — what do they signify?

MH: They were for the opening and closing of the ceremony. That is the beautiful part of this which we will talk about in the next issue. When you put together a story on this, it could be extraordinary.

M2: You are known for having a broad spectrum of ethnomusicological interests. We want to hear about your forthcoming book *Magic Compendium on Rhythms of the World* and the "World Series" that you have been producing over the years.

MH: Next time. Right now I am in the middle of this incredible piece with Olatunji, the *Drums of Passion* update. I can hardly think; it's amazing I can even talk. I'm so into this other thing. Would you like to come in and listen to a little bit of it?

M2: Would I?!

MH: Come on. ▲

VIRUSGATE



The Spook in the Machine

by Lady Ada Lovelace

WE NEED TO ASK YOU A FEW QUESTIONS . . .

A good citizen will welcome questioning by the secret police. It is his privilege to aid the State in its investigations — or so runs the basic Orwellian precept. It may well define the relationship of the National Security Agency to the American business community. In the past decade the NSA has established particularly cordial relations with Big Business and that portion of academia dealing with cryptography.

We're talking about the vault-keepers of the nation's money and credit — the great banks, the investment brokers, VISA, MasterCard, TRW and Dunn & Bradstreet. During the eighties the rank and file bought into the NSA's data-encryption scheme — a system that leaves their vault doors ajar. This Data Encryption Standard, DES, has always been crackable real-time, given the computing power that the NSA can command. The National Bureau of Standards set it up, some "suit" from Yale sold a DES package at a winning price, and the surcharge was only that Uncle could nip in the back door and have a look.

Who could complain about that? A grateful business community is pleased to grant privy access to that Agency which has helped guard its data from thieves, saboteurs, competitors and the casually curious. And so it was that we could all sleep more soundly . . . until November 2, 1988, when the Internet Worm and its problematic connection with the NSA woke everyone to some urgent questions. Such as:

WHAT DOES THE AGENCY WANT NOW?

In ways delineated by its secret charter, instantaneously amendable by order of the Chief Executive, the Agency must protect national security. To fulfill this purpose, it has embarked upon a course which it has announced fairly overtly, according to an executive who worked on security systems with the NSA: the Agency wants to be in a position to monitor all communications worldwide.

Computer communications are in the realm of the National Computer Security Center, that branch of the NSA headed by Robert T. Morris, father of the 23-year-old graduate student Robert T. Morris, who allegedly wrote the Internet Worm. Is this an eerie coincidence or part of a sinister plot to extend the Agency's purview to the computer networks? Naturally, we're all betting on the plot.

Until the Worm, an occasional paranoia front moved in and everyone asked: What about the networks, the bulletin boards, the computer underground? Does the Agency bother with them? And everyone answered: Forget it!

ENTER THE WORM

And then came the Worm, pullulating through the gateways, trying to plant copies of itself on every machine connected through Internet, even in the more accessible portions of Milnet, the military-applications network. Each Worm copy was a sentry, in position to monitor traffic and send reports back to a code-specified user account in the network. *The author or authors of the Worm intended to listen in.*

Vampire-shift net hackers discovered the Worm at once. Its processes showed on the monitors and its proliferation slowed processing speed to nearly a dead halt — this may be why its keeper was unable to kill it when he/they discovered its escape. The anti-Worm forces "trapped" the varmint — gathered its code from core dumps produced by Worm errors — and decompilation experts started reconstructing its original C code. Eugene H. Spafford of Purdue's Department of Computer Sciences has produced a detailed analysis of the Worm, complete with some of this reconstructed C code.

THE WORM: A LESSON IN ANATOMY

A look at the code is mildly shocking: this Worm was wonky. It contains code that could never be reached for execution, calls its subroutines with too many arguments or too few, keeps unencrypted lists in core for serial searches, ignoring faster, safer and more economical hashing techniques, and otherwise manipulates the C language and UNIX environment in a fairly naive fashion, exploiting a couple of well-known bugs and ignoring others. Its code had not been processed by *lint*, a common pre-compile syntax checker. It has the look of a makeshift, undebugged first draft.

Moreover, its style is inconsistent from section to section and incorporates one routine that is purely brilliant — an encrypting routine nine times faster than that used at UC Berkeley. This exquisite routine also contains *decryption* code that the Worm had no use for.

RESURRECTION-PERSONS IN THE CODE VAULTS

The lovely encryption-decryption code in the Worm leads even the apprentice paranoid to assume that Robert Tappan Morris the younger copped it from Agency code. John Markoff, who knows both RTMs personally, told me that RTM the younger hung out this summer at DEC World, among some of the best security people on the planet. Whether or not young RTM is the vector for the Worm, it is easy to attribute the golden subroutine to sources other than the NCSC.

[illegible]

ស្រី

Why do folks think immediately of the magic Agency? Why are paranoids always picking on the NSA? A fair first reason is that we can't really *know*

The NSA is not a monolith. The National Computer Security Center is staffed by humans, given to personal bias and style wars. Rumor has it that around the beginning of the decade the military types in the NCSC gained complete ascendancy over the inventors and cryptographers — presumably with the support of their ultimate chief, Reagan. They brought a halt to technical innovation and made the enforcement of the Data Encryption Standard and the shutdown of any opposition to DES a top priority. John Markoff compares this to the takeover of a business by the marketing department.

THE SPOOK IN THE MACHINE

changes of administration or personnel, giving an outsider the scary impression that geologic-slow stuff just dialectically *happens*. A decade of criticism may have finally made its point that improved technological wares, both hard and soft, put a DES-policed American industry at risk.



Lady Ada Lovelace, one of the original Hackers, Berkeley hideaway, protected by UNIX from worldly set, she has recently given up the tango in favor of

THE KINDLIER ONES

George Bush's men, according to another flap-mouth, have moved to further shift the emphasis within the Agency to favor the cryptographers, theoreticians and tech-types, delicately pulling the choke-chain on the uniforms.



presently living in Levantine splendour in her intrusion. Known as the Mata Hari of the cyberpunk belly dancing and is busy polishing her memoirs.

IRRESPONSIBLE JOURNALISM AND OTHER FUN

A footsoldier in our brigade of the Paranoia Patrol has deep suspicions that the Worm was released to serve one side or the other in this intramural scuffle. For what purpose and for whose side this Worm was summoned has made for some exquisite paranoid extrapolations.

The immediate challenge to a suggestion that this Worm was released intentionally is: why such an obvious botch? The released form of the Worm swamped the net; it was impossible to miss. Wes

Thomas, high-tech entrepreneur and former intelligence systems analyst, proposes that None Such Agents were "pulsing the system" with a crude worm, to analyze how system networks responded to invasion. His theory has both RTMs working together to scare the private sector into taking seriously the threat to security posed by worms and viruses.

Or, hitting new depths of irresponsible journalism, we could posit that malcontents within No Such Agency — those so-called code warriors — whipped out the Worm on a slow night, and released it in all its first-hack crudity for some malicious reason of their own. One possibility is that some closet rebels hated bugging the hackers' conversations on the nets and chose this method of tipping off everyone to what was going on: an early version of a network snooper must point directly to "No Secrets Aloud." The Cornell entrance for the Worm could have been contrived by code-warrior types to frame young RTM and embarrass his father, who seems to have lots of non-fans. One scurrilous lie describes RTM patriarch buttonholing hapless nerds at seminars and demanding, "Have you been washed in the blood of the Lamb?" Depending upon the response — a simple yes or no would do?? — theological testimony or exhortations follow. "Watch out for what comes out of the beard" is a final slur, from an anonymous RTM-hater to whom no credence should be given.

On the darker side, casting Robert Morris the elder as Abraham, made to sacrifice his son on the altar of Agency necessity, is a paranoid's dream. RTM major is a natural for Old-Testament typecasting, and rumor-mongers love him for the role. If NSAgents were culpable, perhaps RTM the greater, uncertain of the implications of its genesis and release and most eager to damp out repercussions for the Agency, could have chosen to cast suspicion for the Worm — obviously just a meaningless prank — and its release — purely accidental, obviously — on RTM minor, who has a couple of very mild practical jokes in his history. Any immediate damage to either RTM could be justified to save Agency face and might be compensated later on.

WHO'S COVERING UP?

An early paranoid suggestion from one of the Worm's trappers is that a lone assailant wrote and released the Worm to impress Jody Foster. Any fantasts who want to contribute to the paranoia file will be rewarded only by their own amusement. Our own paranoia index forbids publishing another goddamned word on this subject. ▲





FROM HERE TO ALTERNITY

*John Lilly in Conversation
with Jeffrey Mishlove*

Hello and welcome. I'm Jeffrey Mishlove. Today we're going to explore the Province of the Mind. With me is Dr. John C. Lilly, a noted pioneer of mystical states and states of consciousness and also interspecies communication. Dr. Lilly is a former researcher with the National Institutes of Health; the Maryland Psychiatric Research Center, the author of some five books on human/dolphin communication, including Lilly on Dolphins, Man and the Dolphin, The Mind of the Dolphin, Communication with Dolphins. He's written many books on deep inner exploration, including The Deep Self, The Center of the Cyclone, The Dyadic Cyclone and The Scientist. He's particularly noted for Programming and Metaprogramming in the Human Biocomputer; in fact, he introduced that term, the "biocomputer," into our language. In his work with the sensory isolation tank and in his work with dolphins, he has probed the very limits of respectability, conventionality, and, of course, knowledge. Welcome John!

*From the **InnerWork** collection of videocassettes from the cable television series Thinking Allowed.
Produced and directed by Arthur Bloch.*

JEFFREY MISHLOVE: I think that's the beauty of your work — you keep moving further and further, further and further out. In *The Center of the Cyclone*, you described a system for mapping states of consciousness, and you talked about one state that I found most fascinating, which you call +3; mega satori. And in that state, you describe going so far out of your body, and even out of the physical universe, to the point of being at the level of essence.

JOHN LILLY: Right.

JM: That almost seemed to me, in reading that book, like an ultimate state of consciousness, but I know you wrote about it some fifteen years ago. How does it look to you now?

JL: Well, there's one step beyond +3. That's +1. But you're not allowed to remember that once you go into it. It's union with God. That's the true yoga. And so, you're non-human. There's no way to recount what happened; there's no way of saying it, because it's beyond language. All these states are beyond language. Language is a very poor instrument.

JM: In addition to +1, you've mapped out +6. That's a state of consciousness, as I recall, in which the mind can travel to any point in physical or non-physical space.

JL: But you maintain your individuality.

JM: That must be the basic mode of a psychic explorer; I gather from reading much of your work that you've spent a great deal of time in +6.

JL: Right. And in +12. +12 is the blissful idiot. You're in your body, you're right here and now, but everything is happy. Everything is good.

JM: You can feel energy moving in and out of the different psychic centers of the body . . .

JL: And if a bird calls, you hear it echoing through the galaxy. But that's not much use, unless you can get another bliss-ninny into the same space.

JM: And many of the mystical teachings warn against getting stuck in some of these realities.

JL: Right. I haven't been in any of them since that time.

JM: What you also refer to in your mapping of states is +48, which is sort of a perfectly neutral state.

JL: Right. +24 is a professional state of any discipline that you're involved in, where you're lost in the discipline. +48 is where you're communicating with everybody else. And then there are the mindless states, but I don't go into those.

JM: You know, at one point you wrote about the importance of going into the mindless state and remaining perfectly aware, being conscious, in those negative states; not trying to block out those negativities. And you describe that as "burning karma."

JL: Yes. And then there's a chapter in *The Center of the*

Cyclone called "A Guided Tour of Hell," which is -6. That was awful. I never had to get back to that one, and I was never frightened again. I was totally terrified in that one.

JM: I suppose it's what the Christian mystics sometimes refer to as the Dark Night of the Soul.

JL: Well, it was the dark night of *my* soul.

JM: Perhaps this is a necessary part of everybody's journey — to go through the epitome of terror.

JL: Right. And, for instance, there's an Iranian and an American psychiatrist that put 100 patients in a mental hospital in Iran through what they feared most, on ketamine, and they all left the hospital. They were discharged. Now, I tried the same thing after I read that. That evening I took 150 milligrams of ketamine and suddenly the Earth Coincidence Control Office (ECCO) removed my penis and handed it to me. I screamed in terror and my wife Toni came running in from the bedroom. She said "It's still attached." So I shouted to the ceiling, "Who's in charge up there, a bunch of crazy kids?" An answer came back: "Well, you had an unconscious fear, so we put you through it, just like the Iranian psychiatrist."

JM: (*unctuously*) In the realm of the mind, in the province of the mind, we can face all of our fears.

JL: Well, you may not be able to live with it . . . but you should. Try it! (*chuckle*)

JM: I often find in dreams, the things that would destroy the body, in the realm of the mind, don't.

JL: That's right. The survival programs — as I found out earlier from doing neurophysiology — are built into the brain. The rewarding systems — the euphoric systems, the sexual systems, and so on, and then the painful, punishing, anger and so on systems — are all built in. And then you realize that the cerebral cortex has many, many paths to these systems and from these systems, so you don't have to go through all these states.

JM: Let's focus a little bit on some of the terms . . . you mentioned ketamine. What is ketamine?

JL: Ketamine is the most commonly used anaesthetic for very young children and old people. And in the literature, the emergence symptoms are described. Emergence means coming out of the anesthetic. Some doctors don't like the emergence symptoms, so they won't use it. But others know what they are, so they just hold the hands of the patient and help them come out. It was the most commonly used anaesthetic in Vietnam, but some places won't use it at all.

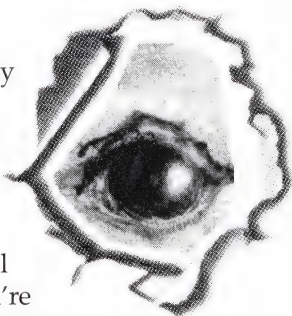
JM: Basically what a strong dose of ketamine will do is make you unaware of your body.

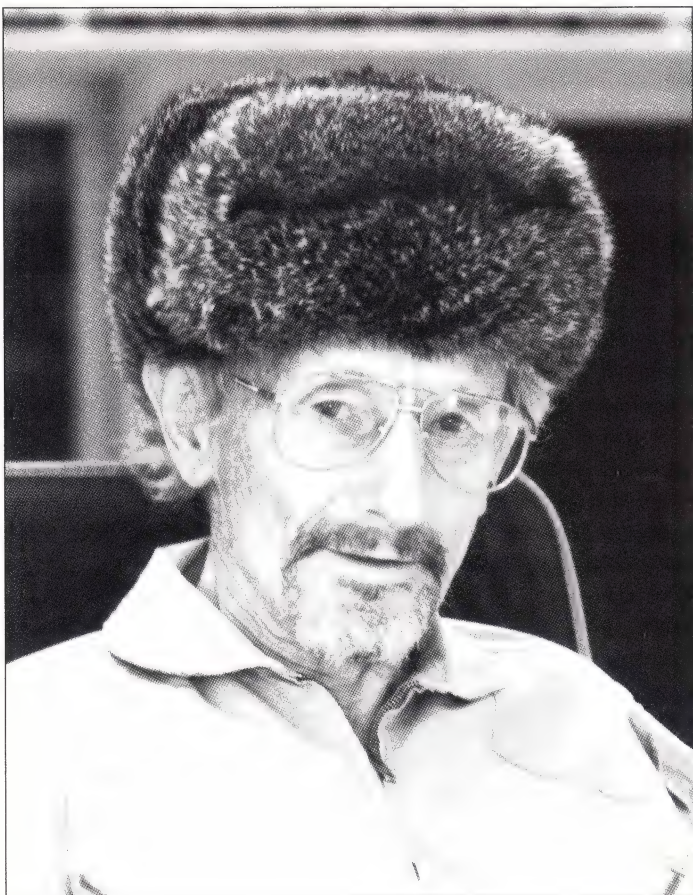
JL: Yes, it can. I don't like it anymore.

JM: But it creates a state where one could enter into inner realities free from the attachments of the body.

JL: Right. ECCO finally told me to stop using it, and to get back here and learn how to be human.

JM: Well, in your book, *The Scientist*, you describe going through a period of very intensive explorations with "vitamin K" to the extent that people thought you were addicted to the substance.





FAUSTIN BRAY

JL: Well, when one is doing research on a substance, one takes it so frequently that outside observers might say you're addicted — but that's a very poor definition of addiction.

JM: I think that, whether you were or weren't, one has to admire your willingness to always push the frontiers of our knowledge further, and it's clear that that was your motivation.

JL: Right. Any good research is obsessive and compulsive.

JM: You also mentioned the term ECCO. What is ECCO?

JL: ECCO. In Italian, it means "this is it." But it means to me the "Earth Coincidence Control Office," which is a form of God's field offices. ECCO runs our lives, but we won't admit it. And if you're an ECCO agent, you must be very, very careful to use your best intelligent method of service. And you realize there are no discoveries, only revelations. And that was a come-down for the scientist; for me as a scientist.

JM: Well, I found in my own work, in the media and in parapsychology, that I'm very much guided by coincidences. I guess it's looking to coincidences as signs along the way that defines what you've identified as "ECCO."

JL: Right. Earth Coincidence Control; it's coincidence control that they do. They say, "We control the long-term coincidences, you control the short-term ones. And when you find out how we do the long-term ones, you no longer have to remain on Earth; you don't have to return there."

JM: It seems to me that your concept of ECCO is a way of modeling, perhaps, the mechanism behind what Jung defined as synchronicity.

JL: That's right. The only place Jung defines synchronicity properly is in his introduction to the *I Ching*. And he uses the term "coincidence" . . .

JM: Meaningful coincidences.

JL: Yeah. But, of course, the coincidences are in your own construction, your own linguistic construction of the events. So that's all a fake, too. As I say at the beginning of my workshops, everything I say here is a lie. Bullshit, in other words. Because anything you put into words is not the experience. It's the representation — a misrepresentation.

JM: And yet, here we are, misrepresenting to each other, in order that we can learn from these lies.

JL: Right; now, if you use language injunctively, as a set of directions, then it's not as bad as it is otherwise. (*chuckles*)

JM: So, in other words, when you talk about ECCO, when you talk about going into an inner reality, using a sensory isolation tank, which is one of the other technologies that you pioneered . . .

JL: In 1954; I invented it.

JM: Or using a number of different molecules designed for this purpose, or mystical disciplines . . . when one enters into one of these realities, each set of instructions carries with it, usually, a belief system. Basically, you're saying that all of these belief systems are wrong, but one needs to hold onto the belief system in order to follow through the instructions.

JL: That's right. Our brains are so small, we have to do this.

JM: So, the belief system itself becomes a tool that we work with, and eventually we have to let go of it.

JL: Right.

JM: In using these belief systems, you've been able to, in effect, map out the terrain of inner space in a manner which has rich and varied flora and fauna, and as rich a geography as one would find on any continent. Perhaps richer.

JL: But if you take the same kinds of trips, you'll find a different flora and fauna each time.

JM: Each time. Hmmm . . .

JL: So, in the province of the mind, there are no limits.

JM: I almost have the sense, though, that we humans create limits of our own to make it interesting. To make the game worth playing.

JL: You can't live as a human without limits. And that's your body. They're hard-wired into your brain. The pattern recognition systems in your brain, for instance. If one hallucinates, say, on cocaine, one sees a bush as an old lady crying with a shawl over her head; and you walk over there and it's a bush. Somebody else walks over there on cocaine and looks at that same bush; they'll see the old lady crying. So this, apparently, is belief pattern recognition systems that are built into our brains, and are given at birth, probably.

JM: In other words, in certain altered states of consciousness, there is an ability, I suppose, to be telepathic; to cognize the thoughts, directly, of another person.

JL: I think it's more than that. The particular noisy pattern of the bush, in striking your brain, is reorganized, personified, by the brain. All brains do the same thing, even if you're not in telepathic communication. So you have an alternate, there. Do you know about alternity?

JM: Alternity? (a cross between a gasp and a laugh) What a wonderful word!

JL: I experienced alternity very dramatically. When I came back from Chile, I sat in Elizabeth Campbell's living room in Los Angeles, in what I call the prophet meditation. I was sitting on the floor, my spine is ram-rod straight, and suddenly a line of light comes down through my spine, leaves of different realities all around me. I could look into the future, and the present is right here in each of those, as it goes out many years from now, and goes to infinity upwards. And a tremendous amount of power going through this. Well, the next morning, I was thrown out of bed by the Sylmar earthquake; and I thought, "Gee! Did I cause that, or was that caused by the same energy that went through me?" And then I realized that this was hubris. He whom the gods would destroy he gave hubris.

JM: They first fill with pride . . .

JL: Yeah, right. And so, I lost my pride, and I realized that I couldn't explain either of them.

JM: But alternity, as you've described it, then, would seem to be a space in which you are in touch with many alternate realities, all simultaneously.

JL: Yeah. And then you get caught with one.

JM: It seems very similar, in a way, to what physicists are describing when they talk about a multiple universe interpretation of quantum physics.

JL: That's right. Francis Jeffreys is writing my biography and describes alternity from the

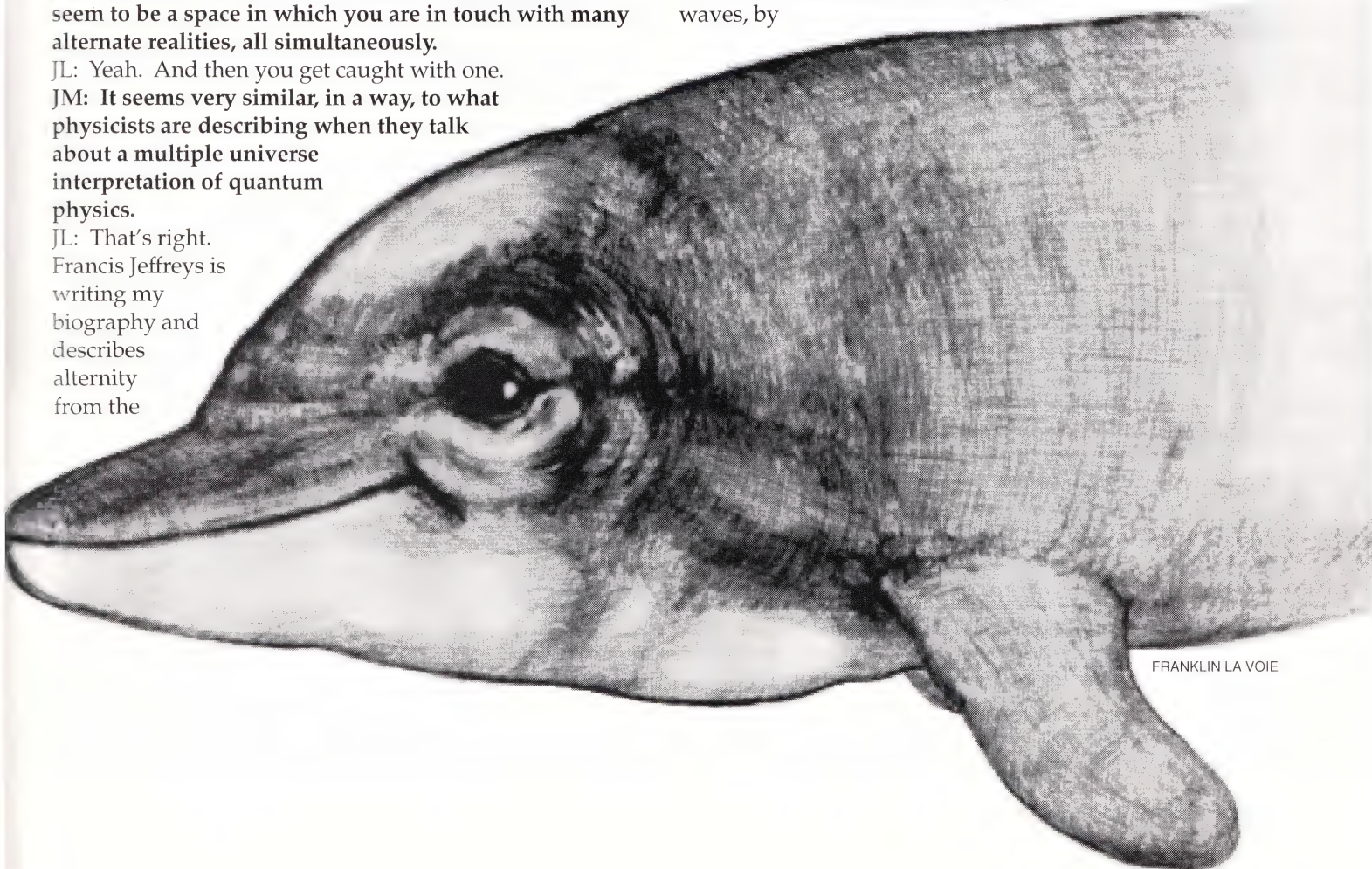
wave function of quantum mechanics. When you collapse it, you've chosen one alternate.

JM: You've referred, several times now, to the fact that in the province of the body, there are limits. And you, yourself, have thrown yourself up against those limits on many occasions. In your writing, you seem to be warning people not to do what you've done.

JL: That's right. They don't have to. See this hand? I have to keep it in ointment, because 11-11-87 I drove my car up a slight bank, turned it over and totalled it. And this was the battery acid, burned this hand. And these knuckles are broken, but that's all. If I had had my seatbelt on, I would have been decapitated. But ECCO was showing me something — that I wasn't exploring alternates properly.

JM: There's a wonderful section in *The Scientist* in which you describe a conversation amongst different beings who recount how carefully they worked to create the series of coincidences so that you could have an accident in which you nearly died, and where you were resuscitated by your wife Toni, who had just learned mouth-to-mouth resuscitation a few days earlier . . .

JL: Right. Then the other accident, the one that closed off "vitamin K" for me, was where I was going down Decker Canyon Road on a ten speed bicycle and the chain caught, and I hit the road and nine bones were broken. But I didn't say in *The Scientist* that I was on PCP at the time. Forty-two milligrams ingested. So, I was "out" in the hospital for five days and five nights, and I was taken by ECCO to planets that were being destroyed by supernova waves, by



atomic warfare, and so on. It was incredible. And I'd try to come back here; I'd come back, and Toni would be there, and I'd hold on for six or seven hours, then they'd take me back out again. I hadn't finished the lesson.

JM: What do you think the lesson was?

JL: The lesson in that case was "look up the dose of PCP before you take any." It's two milligrams, not forty-two. And the other lesson was, I came back wanting to put on radiation suits. This planet is *not* very stable. It can be destroyed at any time.

JM: There's a sense that the way you live your life — right out on the edge of what would be called normalcy or the edge of what is conventionally safe to do, but the very edge of what is physically possible for human beings to do . . .

JL: Yep! Exploring the limits of the body.

JM: Yes. And that in so doing you've discovered, like the fool in the Tarot deck. You've put yourself into this position of nascent wisdom in which you're bound to make mistakes.

JL: I have a saying, "There are no mistakes, only correctable errors; there are no errors, only alternate programs."

JM: You've lived your life so much in an internal reality that I almost feel like your being with me here in a TV studio, it's like you've come up for air a little bit, to breathe together with us and to share what it's like in these vast, vast realms, light years away from planet-side reality.

JL: I call that in-sanity, and where we're talking together — out-sanity. And you should never try to express all of your in-sanity in your out-sanity, or they'll lock you up.

JM: But, in a way, you've expressed more of your in-sanity than most people would ever dare to.

JL: Well, a lot of people take my work as license to go further on that.

JM: One would almost think that an entire generation feels much freer to describe their own inner experiences because people like you were doing it at a time when it was much riskier.

JL: I'm always surprised by how many people have read my books and been influenced by them.

JM: Well, I can certainly say that that's the case for me.

JL: I think you'll like the new edition of *The Scientist*. It has all the things I left out of the first one. Seventy-five new pages of it and fifty new photographs. And in the new edition I admit that it was ketamine, not "vitamin K." (Note: the new edition of *The Scientist* has just been published by Ronin Press in Berkeley.)

JM: But you're not using ketamine, currently.

JL: No, I don't like it anymore.

JM: Are you still doing work in sensory isolation?

JL: Once in a while. But I never talk about what I'm doing currently. Remember *The Human Bio-Computer*?

JM: Yes.

JL: I was doing that work with LSD in the tank in St. Thomas and the National Institutes of Mental Health

thought I was just working at the office. So, when I sent them *The Human Bio-Computer*, the report for five years of the fellowship, they wrote back, "We didn't realize we were going to get a monograph from this work." I don't think they read it.

JM: And they cut off your funding shortly thereafter, didn't they?

JL: Yes. Somebody told the people supporting the dolphin research that I had brain damage from LSD. Well, I got that rumor, so I took it to the head of the Mental Health Council that was supporting the work. And he was also the head of the Neurological Institute in New York. And he got angry when he heard that, so he spent three days examining me; I've never had such a thorough examination. He got angrier and angrier. He said, "There's absolutely no evidence. Do you want any more research money?" I said, "No, I've quit that." So he said, "All right, I'm going to fire two people. One at the Institute, and one in my committee." And that's what he did.

JM: Well, the really special thing about you is the fact that you really have a foot in both worlds, the scientific camp and the mystical camp. And in a way you seem dissatisfied with both of them . . .

JL: Unbeliefs are unbelievable. That's a gnostic point of view. Self-transcendence — not transcendence through a church or a group.

JM: Back, fifteen years ago, you were exploring the states that are described classically as the various levels of

Suddenly the Earth Coincidence Control Office (ECCO) removed my penis and handed it to me. . . I shouted, "Who's in charge up there, a bunch of crazy kids?"

samadhi, in your work with Oscar Ichazo in Chile, in the Arica school. And you had achieved, as we described earlier, some of the very highest states of those mystical traditions — states that are viewed as being ultimate states. I get the sense from you that you don't think of them that way . . . you think of them more the way a scientist would look at tools.

JL: Well, Patanjali, for instance, 400 B.C. said "When you reach the highest form of samadhi, you realize there are hundreds more beyond that." I agree. There's no limit.

JM: Let's get back, for a moment, to your work as a scientist. You've covered a number of different conventional fields of science . . .

JL: Right. ECCO insisted that I go through all that — get psychoanalyzed. 18 months. And then three years, 5 to 7 days a week, I was in training. And then I decided I needed to have the scientific observer isolated so he could study himself, so I invented the isolation tank in 1954. And after a year of that, I needed to work with somebody that

stayed twenty-four hours a day, floating around.

JM: And let's just define, for viewers who may not know, what the isolation tank is.

JL: Well, currently, it's 10 inches of water in a box that's about 8 feet by 4 feet, and the density of the solution is such that you can float; even your head floats. Magnesium sulfate 50% solution, at 93.5 degrees Fahrenheit, and total silence.

JM: And the temperature, and the salinity and the silence all creates the impression of floating in empty space.

JL: Right. And you can easily let go of all the muscles in your body and so on . . . leave your body if you want to. So, I worked with that for ten years, and people tried to get me to take acid and I wouldn't do it. LSD — I wouldn't do it. Then finally, after ten years, I got up the courage and took it.

JM: So, over ten years, you must've logged thousands of hours.

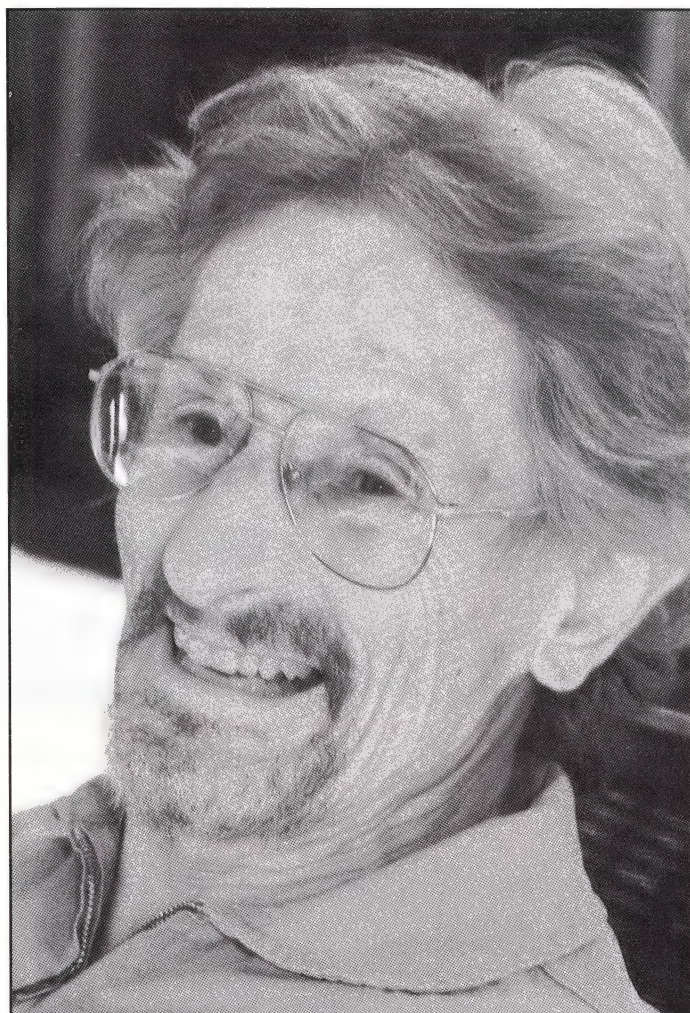
JL: No, hundreds. Because it was very difficult. You had to wear a mask and all that, but at the same time, it's where I did my first LSD experience. I had sea water, so I could float on my back without all that trouble. And I had pure Sandoz; injected it, 100 micrograms. I was terrified. And a memorandum appeared — I actually hallucinated a memorandum from the N.I.M.H.: "Do not take LSD alone. One of the researchers took it alone and his tape recorder ate him up!" Well, I found that terror was rocket fuel. And I think I went further into the universe and many more dimensions than I ever have since.

JM: Can you contrast, for a moment, your experiences in the isolation tank without LSD, with the experiences you had later on with LSD?

JL: Well, the ones without LSD, I could control. And my girlfriend from Montreal came in the tank, as it were. *As if* came in the tank (the 'as if' philosophy) but I could abolish them instantly. But with LSD you could not abolish them. The energy is so high, at 300 micros of pure Sandoz, there's no way you can boss them. In fact, you're not there as a programmer. You're being programmed most of the time.

JM: So the difference would be the difference between creating thought forms and mental images as opposed to being created by them.

JL: No, they're not created by one's self, one allows in both cases. But they're more powerful with LSD, that's all. Now, when I was floating around I thought, "Gee, maybe I should find someone who does this twenty-four hours a day." So I went to Pete Scholander, the biologist, and he said, "Dolphins. Go down to Marineland in Florida." So I went down; sure enough! They have brains larger than ours, they are floating around twenty-four hours a day. And I thought, "Boy, they must meditate very peculiar things." You know? Totally unique that we don't know anything about. And whales, who have much larger brains, must be much further out than we are. Well, that *was* kind of discouraging, then I began to have mental telepathic experiences, of sorts; both on LSD and off LSD. And the dolphins did what I call 'zapping' me. Incredible.



Powerful exchanges would take place when I was alone with them. They wouldn't do it when anyone else was around. But my friends also got zapped when they were alone with them.

JM: What is this experience like, being zapped?

JL: Well, I'll tell you. I took LSD the day they abolished the possibility of research with it — I took my last dose. I went out north of the British Virgin Islands, on a friend of mine's boat. And I sat on the back and looked out. And suddenly he shouted, and I felt two presences coming up on me. He shouted, "Two dolphins!" And then, right after that, I felt a huge presence and a little one, and he shouted, "Whale!" and here was a fin-back whale, so we went over, laid beside her and she zapped me. And I've never had such a powerful blast of mental telepathic information being shot into my brain. It was so fast and so powerful that I couldn't follow it. But I remembered that ECCO had said sometimes we receive too much information to grasp now, but it will all be stored, and when you need it, it will come out.

JM: And, of course, even if we look at the physical language or sounds of whales and dolphins, these high frequencies — they can compact so much information into a short period of time, much more than the human mind can process.

JL: That's their physical communication. But the non-



physical communication — call it psychological, if you wish — it's parapsychological, and still, of course I believe that it's a part of psychology and eventually it will be proven. So you won't have to say 'para' anymore.

JM: That would be nice.

JL: So, anyway, this blast hit me, and for twenty minutes, she just riveted my attention. She turned one eye up and kept it on me. She had a baby that was feeding on her. And then suddenly she just went like this. (*he motions*) She dropped down in twelve thousand feet of water, and just disappeared. Well, I've never had such an experience as this.

JM: As if she knew she was blasting you with something.

JL: Yeah, oh, yeah, it was consciously, very much so . . . she had a brain of 8,000 grams or so.

JM: As if to say, "OK, John Lilly, take a dose of this! Bzzzzt!"

JL: No, "Human," she didn't name me, she just said "Human." "Human paying attention." And obviously, on LSD, I was paying attention. Riveted.

JM: So, you had this appreciation of the telepathic aspects of interspecies communication right from the very start, and yet much of your . . . well, the Institute's . . .

JL: I never acknowledged this in any of my books.

JM: Nor could you have been funded if you had, I suppose.

JL: You know, there's a dolphin trainer in New Zealand. Forget his name at the moment, but he wrote a book . . .

JM: Frank Robson? *Thinking Dolphins and Talking Whales*?

JL: Right. And he trained all of his dolphins from the side of the pool, with no hand gestures or anything, by mental telepathic pictures.

JM: As I recall, he was given an award; he was knighted by Queen Elizabeth.

JL: Really?!

JM: Well, there was an incident in which a number of whales had gotten beached on a sandbar. And they were stuck, and it looked like they were going to die. And he came out, and using his telepathic methods, gave them all instructions, and they were all saved.

JL: Beautiful. I met him at the Whaling Commission, in Washington. Very nice man.

JM: Well, there seems to be now a world-wide network of people who are involved in swimming with dolphins in the ocean, living with them, interacting with them, and

documenting dream experiences and telepathic experiences with dolphins.

JL: Last summer, we let our two last dolphins go; we trained them first so that they could survive real well; and they're sighted every once and a while. They have marks on their dorsal fins. And we're so proud to be able to do that. I'm pretty upset with some of the people at the Oceanarium. They don't like to see precedents like this. And have it so easy. We had them in captivity for eight years. And yet they were able to find a pod and go live with it.

JM: Well, I think that much of your work, John, has been as an advocate for cetacean intelligence. All of the work that you've subsequently done in mapping the human mind and exploring the various realms of consciousness has sort of come out of your impulse to get closer to the cetaceans.

JL: Well, when I tried in a tank, it immediately exposed me into the dolphin group mind. I never want to go into that again. And then they passed me on to the whale group mind. And this is so fast, it's incredible. It scared me to death.

JM: Let's move, a moment, into another area that I know has been an important influence on you. Let's talk about Patanjali and his Yoga Sutras.

JL: OK. Well, by coincidence, Patanjali wrote his Yoga Sutras about 400 B.C., the same time that Aristotle wrote about dolphins. And Aristotle stated, "The voice of the dolphin in air," — now, why would a dolphin speak in air? When he's consorting with humans and wants to communicate with them. So, Aristotle must've had some in shallow water. The voice that a dolphin hears is like that of humans. They can pronounce vowels and combinations

of vowels, but they cannot pronounce consonants. Well, we found out they were mimicking our consonants in the ultrasonics, where we can't hear, but we put out. Now let's go back to Patanjali at the same time. He wrote 193 sutras, the basis of Jnama yoga, mind yoga.

JM: A sutra is a short aphorism.

JL: In Book Four, Sutra One, he states, "Jnana ausadhi tapah mantra samadhi jah siddhayah" Well, Jnanna is by birth, ausadhi finally worked out to be light containing herbs. Tapah are religious austerities, mantra is word power and samadhi is autohypnosis at a deep level, and siddhis are the psychic powers. So the psychic powers are derived from these things. So, at the Yoga Research Society in Philadelphia in November, I retranslated them. I stated that in order to use the light-containing herbs, psychedelics, you'd better have all these other disciplines. Out of the auto-hypnosis, religious austerities, or academic austerities; disciplines, self-meta-programming and so on.

JM: The most ancient Hindu literature, the Rig Veda, refers to the use of Soma quite extensively, which is now thought to be some type of psychedelic substance.

JL: Right.

JM: One might view that as the basis of all of Hindu philosophy.

JL: Well, if you track all the mystical schools, you'll find way back, they all employed something. And, they reemployed it — LSD — with Oscar Ichazo.

JM: With the Arica Institute.

JL: Nobody wrote this up at the time. I didn't either. I think it's far enough back, now, to be able to say it.

JM: Very interesting. And that may account for . . .

JL: I had pure Sandoz. I brought them in, and we had hundreds of windowpanes. So, the Instituto de Gnoseologia had a chemical basis, too.

JM: Very interesting. What has happened to Arica at this point?

JL: I don't know.

JM: We don't hear about it.

JL: Oscar's in Maui living with a beautiful woman in one of the valleys. That's all I've heard.

JM: (in all seriousness) It's as if that was a flower that came and bloomed and, perhaps, faded.

JL: Well, isn't everything? All the trips are. Gnosticism is.

JM: Well, John Lilly keeps going.

JL: Ha! Barely. Believe that. Battery acid burned my hand, and I totalled my van; went to sleep at the wheel, turned it over; you should see the wreck. If I'd had my seat-belt on, I'd have been decapitated. But, the guy who was running this body who fell asleep left at that point probably went to another body. And I came in. And I was told bring happiness to this body, so that's what I've been doing ever since.

JM: Well, I'm sure the body appreciates that.

(uncomfortably) Can we tie this in to Patanjali? Is there some way to do that?

JL: Yes. Patanjali said, in getting your psychic powers, you sacrifice yoga, and so you have to drop them once you get

them. Of course, you get them with LSD and all these other substances, but you must drop them in order to eventually fuse with God. And so, for instance, in state +3, I didn't use LSD. And that was my union with the Creator. Patanjali tells you how to get rid of psychic powers, and how to achieve the highest form of samadhi, the highest form that humans can know, which is the beginning union with God, but above that there are other Samadhis even higher, which cannot be expressed in words; Patanjali could not teach them. So there's the infinite province of the mind, again.

JM: Patanjali describes the need to blend the use of light-inducing herbs with the various yogic disciplines. Is there a sense in which, in our culture and maybe even in your life, some of the hazards have come from not following Patanjali's admonitions?

JL: Well, Patanjali doesn't give you the proper directions for using the light-containing herbs.

JM: What are they?

JL: I've had to develop those myself. And now that they've been developed, there's probably more LSD being used than there ever was. Because it's used safely now, so there aren't these appearances at the emergency wards that there used to be. Because everybody's learned and can teach what's going on, in spite of the Drug Enforcement Agency.



JM: (*rapid change of subject*) Let's talk a moment about the consciousness of cetaceans. Their culture, their civilization, their way of life is much older than ours, is it not?

JL: Dolphins have a brain the size of ours, 25 milliliters. Ours are where theirs were theoretically 100,000 years ago; that's when

ours started. But we're not sure of that. The sperm whale has the largest brain on the planet, six times the size of ours, 10,000 grams. So he's like a committee of six humans all in one brain. Now, the only observations we've had of sperm whale behavior that make any sense, is that someone flying over the Pacific saw a rosette of 16 sperm whales all facing into the center of a circle, so apparently they were having a conference. The whole Indian Ocean is now a sanctuary. No whaling can be done for sperm whales.

JM: Well, if our mystical traditions go back 10,000, or maybe, as you say, even 100,000 years, if there is a shamanism, a mysticism among whales and dolphins, it would be so much deeper . . . so much more elaborate and involved . . .

JL: Yeah. Incredible. Absolutely incredible. And if they're in communication with extra-terrestrials — did you see *Star Trek IV*?

JM: Yes, I certainly did.

JL: The humpback whale songs? (*breathlessly*) Being played by the probe that was coming in from extra-terrestrials, looking for the humpback whales, so they had to go back in time and bring some humpback whales up, just so the probe would shut up and not destroy the earth?!

JM: (*gropingly*) Well, uh, I gather from reading your books that this type of possibility is well within the realms you've explored . . .

JL: Right. And if we'd just talk to the whales, maybe they'd tell us what went on on the planet; how many times humans have appeared and disappeared. A friend of mine wrote a book called *Cosmic Catastrophes* in which he went through what could happen to the earth. There's ten of them. I went through all those on PCP; you just wonder how we're going to last at all!



John Lilly with Mensa astrologer and dolphin saver/heroine Linda Clark

JM: I know; it's the greenhouse effect, and if it's not that, it's the nuclear winter . . .

JL: Or, if it's not that, it's a supernova cloud hitting us; other than that, it's our atomic war.

JM: Do you feel that in your own explorations you've been able to contact this level of the dolphin mind?

JL: No. I'm too limited. We all are.

JM: You have described in your works, though, feeling or entering into a belief structure in which you were in contact with an extra-terrestrial reality.

JL: Right. But limited ones. Not the — oh, I'm trying to think of the largest, but they lose me as a single thought in a huge mind. Who should pay attention to single thought?

JM: In other words, you feel that the communication was all one-way?

JL: No, I just feel I was being programmed by that mind. Without the mind knowing I was there at all.

JM: That must've been frightening!

JL: Well, it was humbling. I didn't get frightened then. One can't afford fright during those things. You have to maintain some sort of equilibrium.

JM: You have somehow managed to do this. You have entered into realms that conventionally would clearly be described as psychotic . . .

JL: Sacred.

JM: Yeah. *Sacred* realms. There's such a thin line between the ridiculous and the sublime. You've entered into these realms I think because of your early training in science and because you're real curious . . .

JL: And my Jesuit training in the Catholic Church.

JM: And rejecting the belief systems of the Catholic Church . . .

JL: Well, I'll tell you about that. When I was twelve I had my first orgasm and I thought, "This is really a God-given pleasure! It's incredible, absolutely incredible." Next week at confession, the priest called this a mortal sin, so I left the Church. A friend of mine, Lisa Lyon, whom I adopted, Lisa Lyon Lilly, said, "The Devil is an angel directly from God who's trying to teach men and women that the pleasures their religions call sinful are really the deep worship of

***I came back wanting to put on radiation suits. This planet is not very stable.
It can be destroyed at any time.***

God." He shares with you.

JM: Veddy Tantric!

JL: I like that.

JM: Well, I guess it must've been some type of experience like this that has allowed you to maintain a kind of equilibrium as you've gone into these states, and come back, analyzed them and reported on them.

JL: Well, I don't think the guy who went in is the same guy who came out. I figure this body has had about twenty different inhabitants.

JM: Different egos?

JL: No. Different consciousnesses. See, the others got tired of the body and left. Usually during an accident, a severe accident; they said, "Oh, the hell with it, this being human is dull. Look what happened!" So another one comes in that wants that kind of experience, you see?

JM: Now you're reminding me of a phrase I think Ruth Montgomery called "Walk-Ins."

JL: Right. Right. Right.

JM: That might be a more apt way to describe your process.

JL: Well, they don't walk. (laughter) They just appear. It's the *Star Trek* transporter.

JM: Interesting. What an interesting life!

JL: Am I getting more and more vague to you now? (howls with laughter)

JM: (bemusedly) Well, I sometimes wonder, where do we take things from here?

JL: Well, sex is very real. Women are still the other half of the human race. That's what this body is doing now, finding out about all of that. So I grew a beard, and show it to the ladies and they know I'm a man (he laughs again) ... very simple things.

JM: Bringing pleasure to the body now.

JL: Yeah, right. Transforming it.

JM: Some of the other inhabitants of the body pushed it to the painful limits and now you're here to heal it.

JL: Right. And find the ladies that will help!

JM: You know, you're a real pioneer. People look up to you as a person that has dared to go places that very few people would dare to go and as you point out, you've been burned a few times. If you were to try to leave a few words of wisdom to the younger generation, what might you want to say to them?

JL: What Socrates said, "Know thyself." But also, distrust what you *think* you know of yourself. And continue to explore, get a blow on the head and change the whole thing, and so on. But look to the top, the peak, the highest intensity. Take psychedelic drugs. But take them knowledgeably, in the isolation tank, where it's safe to do

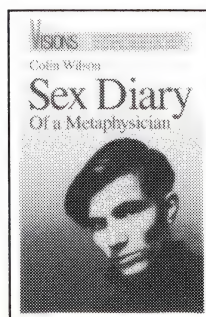
it. And I've written on everything else that they should do.

JM: Well, John Lilly, it's been a pleasure having you with me. Thank you very much.

JL: Thank you! It's been a pleasure being here. You sure do know how to ask the right questions! ▲

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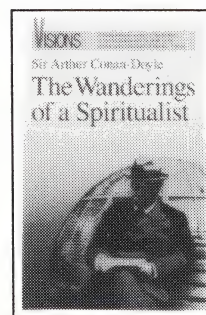
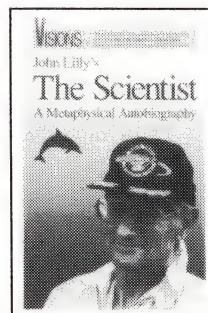


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TERMINAL DISORDERS

by Morgan Russell



The banking industry has acted with almost criminal negligence when it comes to the security of their customers' ATM accounts. This in the face of almost daily media coverage on the antics and depredations of cyberpunks. The industry's apparent nonchalance betrays a level of stupidity at the highest levels of bank security undreamt of by the average patron.

The banks have set themselves up for a wave of incredible losses. This is particularly true of the way data is handled at remote ATM terminals at grocery stores and gas stations. If you use an ATM card, your bank account is particularly vulnerable at such terminals, as we shall soon see. And all ATMs are sitting ducks for the dedicated cybercracker.

Let's track the procedure for drawing money out of an ATM to observe the fatal flaw. First, the customer inserts his ATM card and is instructed to enter his "secret code" which is usually four-to-six characters long. This information is modulated by a modem and sent to the bank's computer which checks the nineteen-digit card number and the four-to-six-digit PIN (Personal Identification Number) code. If a match is made, the machine asks how much cash (or authorizes the purchase) and sends the central computer the details of the transaction. All this takes place through standard modem protocol with no attempt, at present, to encrypt the all-important details. Banks while using more secure

dedicated phone lines for their own ATM machines, have allowed many "convenience" locations for twenty-four hour fast cash to spring up without making even a perfunctory bow toward security. The many gas stations and grocery stores with ATM card services are easy marks for tapping. If you have an ATM card which you use at any of these locations, your account information is out there for the asking.

HOMEBREW BANKING

Silicon Valley Surplus in Oakland, California, home of the Homebrew Robotics Club, advertises "Voice Response Terminals" in their Summer 1988 catalogue. Their ad copy states, "We got these from Crocker Bank as excess inventory when Wells Fargo bought them out. Brand new units still in the factory box!" "Only \$9.99" (originally over \$400) to own the same type of credit card reader used by the banking industry for credit verification. Any enterprising cyberpunk can modify these devices into card-writers which produce credit cards with whatever numbers are desired. Simply put, Wells Fargo (or Crocker) released its supply of extra card readers to Silicon Valley Surplus for approximately \$5 apiece rather than have them collect dust — a somewhat less than brilliant move.

SOMETHING IS BREWING

Security Pacific National Bank — a misnomer if ever there were one — lost nearly \$350,000 over the Veterans'



Day weekend last year to someone using a special bank card. She only went to ATMs without surveillance cameras. She was never found.

ATM-cracking has even become a family activity. On February 4th, the FBI arrested Mark Allan Koenig and a group of his friends and relatives for planning a large ATM job involving the Bank of America. One might imagine a close-knit convivial group — a financial affinity group — gathered around their IBM PC and a borrowed encoding machine. They must have looked like a bunch of kids working on a class project — with posterboard, paper cutter, glue, and roll of magnetic tape at the ready. And what a class project! A projected \$7-\$14 million heist! Yet trouble came when a friend asked to participate in the ATM outing, went to the Secret Service to inform them of her friends' plans. She then recorded a meeting of the group in order to set it up for a bust.

Both the \$350,000 Veterans' Day heist and the Koenig Plan relied on information and materials that aren't accessible to the ordinary individual without special connections. And the ATM companies appear to be taking protective measures: "Plus Systems (a network linking 25,000 ATMs) plans new steps to ensure that contractors comply with procedures to protect secret account information," states the *LA Times* reassuringly. Yet while these financial groups are protecting data from people on the inside, any enterprising cyberpunk on the outside can knock off ATMs at any of 72,000 convenient locations twenty-four hours a day. Sleep well, citizens . . .

The average person doesn't bear the brunt of the loss. "Customers do not lose money from this type of fraud because they are reimbursed for any charges to their accounts," states Douglas Frantz of the *LA Times* in its account of the Koenig affair. Banks, eager to allay customer paranoia about the safety of their accounts, have let it be known that they'll absorb any loss. This, of course, is the final detail which will send the wavering cyberpunk to the nearest electronic salvage store — people have about as much sympathy for banks as they do for sharks. Poor babies! . . .

Prosecution of cyberpunks will avail little to stem the tide. The information will become more widely known through newspaper accounts and court transcripts. As the banks scramble to change their security measures, the cyberpunks' repertoire expands; it's like fighting a guerilla army on their own terrain. Cyberpunks are precisely the ones best able to adapt to rugged field conditions and shifting game rules. They thrive on complexity. And there's nothing the average Joe can do but become a Luddite or refill his Valium prescription.

This article is for informational purposes only and is designed to alert a sleeping public to the menace that lurks ahead. Until banks wake up to the folly of their ways, what can you, John Q. Burgher-Citizen, do? First: Do not use your ATM cards. Demand that banks institute fresh security measures. And relax and enjoy the continuing adventures of Doktor Mabuse among the high-tech low-life of Berserkeley, California. ▲



This article, as originally submitted, included explicit technical diagrams from a "hack-a-tract" which would have enabled the savvy hacker to avail himself of "electronic subsidies." After careful consideration, the publishers decided not to print these for both ethical and practical reasons.

"I hope that, after reading the following pages, the leaders of the Y.M.C.A. will start a campaign to induce good young men to do nothing. If so, I shall not have lived in vain . . . Hitherto we have continued to be as energetic as we were before there were machines; in this we have been foolish, but there is no reason to go on being foolish for ever!" — Bertrand Russell, In Praise of Idleness

"The Vomit Vomits in the Vomit?" queries a man's voice which drifts from the Rare Book Room at Serendipity. I stop rummaging for an instant and cock an ear.

A panting sound.

"Fuck You Press?" A woman's voice eagerly volleys back.

"No, Press of the Black Flag Raised," the man returns.

The panting persists.

"Hm-m . . . let me see . . ." the woman's voice trails off.

The panting grows stronger. An oral slapping sound joins it.

"Oh, my God!" moans the woman.

"Hitler, come back with that!" the man barks. There is a vague hint of an accent.

A furry apparition bounds past me — a huge black hound, covered with hairy spikes, carrying a book in a show of bared teeth, races around the long bank of bookshelves.

An alarmed-looking man, with obsidian-dark glasses, and a perfect dandelion-shock of hair, bolts out of the Rare Book Room. It is, unmistakably, Doktor Mabuse.

"Cur," he shouts after the dog and reaches into his black cashmere catsuit. Drawing out a leather pouch, he shakes

out a handful of small brown beans. As if in answer to a question, he says, "Chocolate-covered coffee beans." Catching my fascinated gaze, he elaborates. "They've got them over at Cyberbia and the Cyberbanites have got Hitler hooked."

"Cyberbanites?" I query.

"Members of Cyberbia — a new club I have a hand in. It's down in Ebonyville in the warehouse district." Mabuse whistles. One canine eye, a partial snout, and the corner of a book appear from around a bookcase. Mabuse flicks a chocolate espresso bean with his thumb as if he were shooting a marble. The bean skitters to within a few feet of the suspicious dog. He regards the bean, then Mabuse, then the bean. He drops the book.

"Good! Now, Morgan, you go get it as I lure him away."

Mabuse fires more beans to the whiffling and crunching hound as I stealthily retrieve the book.

"Well, well . . . what has Hitler selected for me today?" he asks, taking the book from me. "Hitler has a certain dogged genius for bibliomancy."

"Now here's a breath of fresh air! *In Praise of Idleness* — Bertrand Russell . . . first printing . . . I read it years ago — early imprint — but I'll get it for *you*. Leisure as the precondition for any true advance in civilization. Improving read!"

Mabuse turns to the woman, "Do I get a discount if it's dog-eared?"

Outside the shop finally, Mabuse, the dog, and I pow-wow on the sidewalk. "Why don't you come along to Cyberbia?" he suggests temptingly. "I'm on my way there now."

ATMs & THE RISE OF THE HACKER LEISURE CLASS

by Morgan Russell

A short drive takes us to an industrial section in Ebonyville. We pull up in a parking area beside a warehouse otherwise undistinguished except for the motley collection of vehicles: motorcycles with sidecars, vintage English motorcars, motorscooters covered with chrome, leather, studs, bits of glass, fur, and antennae, a 1940 Buick Hydraflyte, and a malevolent-looking matte-black hovercraft with the Survival Research Labs skull logo on its prow.

We enter the building and find ourselves in a corridor painted with black-and-white helicoidal bands. It reminds me of the opening vortex on "The Time Tunnel." Here and there are parked skateboards. Mabuse peers at each one with a connoisseur eye as we pass.

"I see the logos of the OAI, the Interobangers, and the Church of Imron." Mabuse looks at my expression of utter blankness. "You've been spending too much time up in your redwood tower, Morgan. These are the raddest Design Cells and Art Gangs around. Every aspect of their appearance and lifestyle undergoes conscious group design choices. They recruit heavily among young electronic whizzes, muralists, and chemists."

"Everything from their skateboards — with built-in antennae for two-metre radio communication — to their brain-change agents are custom designed. Many use ferulic acid — an extract of rice-bran oil — to get the muscle-bulking action of anabolic steroids without getting the 'roid rages. This place is just flexing with Rambo-hackers — they'd rip your pocket-protector right off with your shirt if they didn't like the looks of you!" he announces with a distinct note of relish.

"The design gangs' lines of division are along lines of interest. The Interobangers, for instance, love to question assumptions and generally mindfuck the bourgeois. 'Question Authority, Sez Who?!' they demand. They speak in sing-song Célinesque ellipsis and are basically a cult of verbal high-jinks."

"The Church of Imron adepts, on the other hand, all carry airbrushes and portable compressors and have a penchant for *trompe-l'oeil* and impossible perspectives. They're guerilla muralists and totally off-the-wall."

"All the gangs, however, have a great appetite for tweeking — for not settling for standard issue. None assume that the final word has been said or that any design, even a great design, is inviolable. 'Nothing is true — Everything is permuted!' is the club motto."

"Cyberbia is an amalgam of salon, mind-gym, workshop, and watering-hole. It's becoming quite popular with the

hacker leisure class — including the likes of Bill Atkinson. Ted Nelson likes to drop by too, though he refers to his visits, annoyingly, as 'slumming.'"

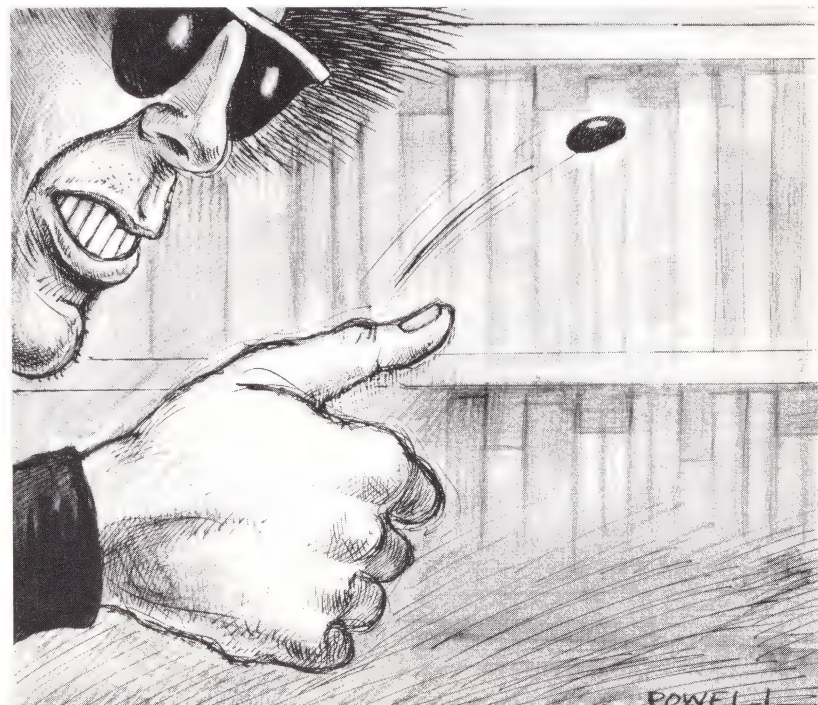
"There are well-equipped workshops where metal parts can be machined, chips analyzed, plastic molded. We've got vast stores of electronic surplus here as well as recycled chemicals."

I'm reeling by now.

"Just who *are* the people in the hacker leisure class?" I ask.

We reach the end of the corridor and pass through a set of double-doors, one of which Mabuse holds open for Hitler and me, and we enter a large room redolent with ozone.

"Well, the whole notion of the hacker leisure class started with that man standing over there by the ionizer," Doktor Mabuse indicates with a nod a figure leaning close to a four-foot-tall black cylinder, blue flames dancing in his hair. As we approach, the white-noise ionic sizzle of the device becomes louder. "He's known as A.T.M. Hoffmann, but obviously that's just a *nom de guerre* — I'm not at liberty to reveal his true name. His influence has been a lot more profound than simply masterminding the methods of 'Electronic Subsidy,' as he likes to call it. He was thrown out of Stanford, rather like Thorstein Veblen, for his radical views on economics and his rampant priapism. And that's when he worked out the nuts and bolts of the system. But his real contribution — a philosophic contribution — came with the publication of his inspirational tracts — the legendary 'Hack-a-Tract' series."





As we draw close to A.T.M., he appears to acknowledge our presence, saying, "The fly is not reasoning well just now. A man buzzes at its ears." He doesn't look up, but rolls his head back and forth letting St. Elmo's fire dance along his scalp for a full three minutes as we look on. Mabuse, by way of distraction, gently pokes his index finger toward the glowing purple tips of the wires which extend out of the top of the device. A multi-blue-hued plasma appears at the end of his finger like the flame of a gas jet, along with a burning hiss. His hair, if possible, is standing even straighter on end.

"Observe, Morgan. One doesn't often see plasma in the open air. This is a quarter-million-volt unit," he says, the twin reflections of plasma in his spectacle lenses making him look all the more the crazed-scientist. "It's about four orders of magnitude more powerful than any commercial unit. It would actually make a good front-end for a particle accelerator."

I back off slightly. "What happens if you get closer?" I ask.

"One would get a rather nasty shock — but any wound would cauterize instantly — *one doesn't bleed*," he smiles, his teeth fluorescing in the ultraviolet. He turns to A.T.M. "Do come along, Hoffmann, old bean — we'll hold a seat for you."

With that, we amble off and settle on fractal-patterned chintz armchairs under a pyramidal Cinzano umbrella connected to a small Tesla coil. *Everything* here seems to be wired, I note.

"What is that remark of his supposed to mean?" I ask. "Probably a quotation from Lautréamont or one of the Surrealists. I suppose he meant he couldn't concentrate on us . . . but one can never be absolutely sure with him. He's a queer duck."

"My-my-my . . . Pomfrets, Pomfrets!" A.T.M. Hoffmann clucks, after having come up to our table soundlessly. "Yes, good people, it is I who direct you to roast upon a red-hot shovel, with a little brown sugar, the duck of doubt with lips of vermouth . . ." he puckers and smacks his lips with eyes closed, " . . . which, shedding crocodile tears in a melancholy struggle between good and evil, without an air-pump anywhere, brings about the Universal Vacuum. That is the best thing you can do."

"Only a remittance man can write like that!" says A.T.M. with an appreciative shake of the head as something arrives to take our order. "I'll have a mineral water charged with nitrous, please, and whatever these mice want," indicating us, "put it on my card."

"Ah-h-h . . ." he stretches. "There's nothing as invigorating as an ion shower — it's like having your soul dry-cleaned. I feel positively freshly-pressed!"

He takes a nasal inhaler and gives himself a couple of squirts in each nostril. "Vasopressin — helps sweep away the brain-sand. Care for any?" he offers.

As I attempt to snuff a dose, Hitler prods my elbow upwards with his muzzle nearly implanting the small plastic bottle in my sinuses.

"Don't you *dare* give him any!" Mabuse orders. "He's already overamped!"

"Say, Mabuse, he doesn't look nearly as green as you made him out to be," says Hoffmann, as I try to extricate the bottle from my nose.

Mabuse clears his throat and gives A.T.M. a significant look. "Er . . . uh . . . Morgan, here, wants to know about your contributions to the hacker way-of-life."

"Well, I'd say the basic insight came the summer after Stanford gave me the boot. I was struck by the notion that the most valuable asset I had was the use of my own time. It dawned on me that I could radically alter the course of my own life in just a few months' time by applying myself to projects of my own design. I'd *had* it with funding agencies and intellectually bankrupt administrators. If one is locked into a corporate slot — and believe me, Stanford is a corporation — a large portion of one's time is taken up with meaningless social rituals and committees. Even one's spare — much too spare — time is spent in fairly robotic routines."

"Self-cultivation has, until now," A.T.M. smiles, "been largely the preserve of the aristocracy and remittance-men who had no one to satisfy but themselves. The average sap doesn't know *what* to do if he wins the lottery or inherits a tidy piece of change. Indeed, the greatest test of character is to give someone a great deal of money and see if he can use it without destroying himself. So-called civilized man has yet to develop the faculties to handle leisure."

"In traditional societies, an average of two hours is spent

'working.' We have a genetic predisposition for leisure and play which has been dangerously subverted by the Work Ethic. Of course, that was never *my* problem. I seem to have been constitutionally endowed with the capacity to handle vast amounts of leisure time. It only remained, then, to determine the best hunter-gatherer methodology — one suited to present-day technology."

Hoffmann pauses to sip his super-charged Perrier.

"One day, fate took me past a bank with one of those automatic teller machines and a line of people waiting to draw out cash. Just at that point, a car with a 'ROBIN HOOD WAS RIGHT!' bumper-sticker pulled up to the curb and parked in front of an ancient Volvo with an 'I OWE, I OWE, IT'S OFF TO WORK I GO' bumper-sticker. Talk about epiphanies! Suddenly Willie Sutton's answer to the question, 'Why do you rob banks?' came to me: 'It's where the money is!' I immediately sought out the nearest café, and wrote my first *Hack-a-Tract*."

"I had, for some time, been tossing various hacks around in my head trying to hit on one which would extricate myself and my fellow hackers from the daily grind. The most able, imaginative young hackers I knew were being actively courted by the military and big business dangling fat paychecks sliced from bloated budgets. Even the most rabid hackers were, in the nethermost pocket of their imaginations, allowing for the possibility that one day *they'd* take a government job protecting the power-elite from their fellow hackers. While, in some macho way, they fancied themselves CyberMercenaries, they were, in fact, only hired help. Many, having a few more toys to play with and more hyperspacious computers, thought *they* were



using the government — insidious self-expiating tripe!, if you ask me. And by this time, Star Wars had become a virtual Social Security system for hackers — a perfectly dismal situation!" Hoffmann sighs audibly.

"The solution lay, as my old colleague Israel Goldiamond might put it, in 'depotentiating money as a reinforcer.' There were two obvious avenues: 1) encourage hackers to become ascetics or, 2) make cash freely available to hackers. A dedicated hedonist, I chose the latter."

"ATMs were an obvious choice. Fast cash with no human contact. There's also a peculiar satisfaction in taking money from a machine. Anyone who's ever lost money in malfunctioning payphones, parking meters, pay toilets, candy machines, or laundromats is delighted with *any* kind of jackpot coughed up by a machine. A solid citizen I know, when at an ATM to draw out money, noticed cash already coily peeking out from the machine. She took it with a clear conscience. In fact, she found the exact amount which she was owed by her insurance company — which had never arrived. In some kind of karmic animism, she saw the ATM as an agent of fate. Incidents like these are commonly viewed as acts of Goddess, as it were — just another rain of frogs. Brrrivet!" Hoffmann belches. "Excuse me — must be the nitrous! Mabuse, old beancurd, be a good mouse and order me a ginger beer with cyclopropane this time around."

Mabuse, with a faint smile and a shrug, beeps our waitroid as Hoffmann continues, "What better medium to justify the ways of Goddess to man than the *Hack-a-Tract*? It allowed for a little rhetoric, a brief expository hack, and a few assorted maxims. Frankly, though, for downright pith, you can't beat the T-shirt. Nietzsche, the original T-shirt philosopher, was a great stylistic influence on me. The aphoristic style forces one to become a gem-cutter. Nietzsche was a real hep cat..." Hoffmann says, bobbing



his head and snapping his fingers, "... too bad he had to go through such shit — all he really needed was better distribution and to get laid more often..."

Mabuse and I chortle appreciatively. The waitroid brings the ginger beer.

"My first *Hack-a-Tract* relates the exploits of the legendary hacktress, Malajustine, and her discovery that those with the best synthetic grasp of the systems in fact control the systems — whether they do it for themselves or for others. For her, it is not a matter of anything as messy-sounding as 'cracking' a system — it is merely 'using the system imaginatively.'"

"Her *modus operandi* runs something like this: she places her Kodak Ultra Life 9-volt lithium-powered bugs at several busy "pay-point" locations and gathers all the account and PIN numbers she needs by pulling them in on her wide-band scanner. She writes another person's account information on the magnetic strip on her own ATM card using a surplus card-reader which she's modified to a card-writer. And one fine day, she puts on her infra-red LED-and-zircon-encrusted sunglasses..." Hoffman catches my confused look as he pauses for a sip of his ginger beer.

"High-output LEDs like Opto-Diode Corporation's OD-100s effectively saturate or 'OD' or 'blind,' if you will, surveillance cameras which typically don't filter infra-red. To anyone on the street, however, they would appear to be ordinary glasses."

"She goes to an ATM, withdraws cash, runs her card past a magnet she carries in her purse, and never uses the same account twice. *Quelle cyberpunque!*"

"I hired students to hand out my first *Hack-a-Tract* on Telegraph along with pizza discount coupons. Soon, unsolicited testimonials of transformed lifestyles started pouring into my post office box along with pleas for advice. Obviously, a fair number of intelligent young people had seized Opportunity but required further guidance. I took these queries to one of the meetings of a local think-tank I belong to. It's formally known as the Chaos Society, but loosely referred to as the Mandelbrot Set... Mabuse, here, is one of its charter-members," Hoffmann says, looking in Mabuse's direction. Mabuse makes an ironic little bow.

Hoffmann continues, "We meet once a fortnight in a bathysphere at the bottom of the San Francisco Bay. We take advantage of the IQ-raising effect of the pressurized 85/15 heli-ox mixture by using the time to consider weighty questions. It's true that discussions in a helium atmosphere sound *rather* like a rendition of Alvin and the Chipmunks, yet we do our best thinking there."

"Anyway, I brought these letters, as I said, and handed

them around the Mandelbrot Set. The advice they gave was highly idiosyncratic, of course, but *all* of it was sounder than Abby's. Hackers were encouraged to deepen themselves with philosophic shovels; to dredge the channels of muddy thinking by continually composing position papers and manifestos *and* signing them; to become minute observers and conversational pinball machines; to walk, wear silk boxer shorts, and read only those things one doesn't agree with... I gathered all the various responses and included them in my later *Hack-a-Tracts*. The obviously deficient were simply rerouted to Nicad Necropontiac and the Remedial Lab."

"The results were most gratifying. Among the newly-liberated — those graced with electronic-subsidies — were a number of gifted individuals. Individual cases are always more interesting to me, though, as it turned out, even the general economy took an upswing with the increased spending by hackers. Even the physical tone and pep of hackers improved by walking around town from ATM to ATM. But, my first advice is not to be greedy. That only opens a whole new can of worms." He snaps his fingers for the waitroid.

"Of course, banks can't do a thing about it so it's become taboo within the industry to even mention it. Banks do a much higher volume of business, without hiring more tellers or building more banks, by using ATMs and the public has come to take the twenty-four hour convenience for granted. Banks — even in the face of 'withdrawal symptoms' — simply can't afford to close down ATMs. They're forced to *eat* a certain loss. Annoying for

them, perhaps, but these same withdrawals provide the monetary lifeblood for a small percentage of the population who might otherwise be forced to take some soul-destroying job developing yet another product of dubious value, for which we'll be assaulted with yet another round of advertising..." he trails off and heaves a sigh as the waitroid brings the check.

"Morgan!" he booms, suddenly riveting me with his piercing blue eyes. "You know Nietzsche, of course? *Human, All Too Human*?"

I stammer and shuffle sheepishly, "Well... uh... actually..."

"Listen!" he says and declaims loudly, portentously: "Scholars are ashamed of otium. But there is something noble in leisure and idleness. — If idleness really is the beginning of all vice, then it is at any rate in the closest proximity to all virtue; the idle man is always a better man than the active. — But when I speak of leisure and idleness, you do not think I am alluding to *you*, do you, you sluggards?!" ▲



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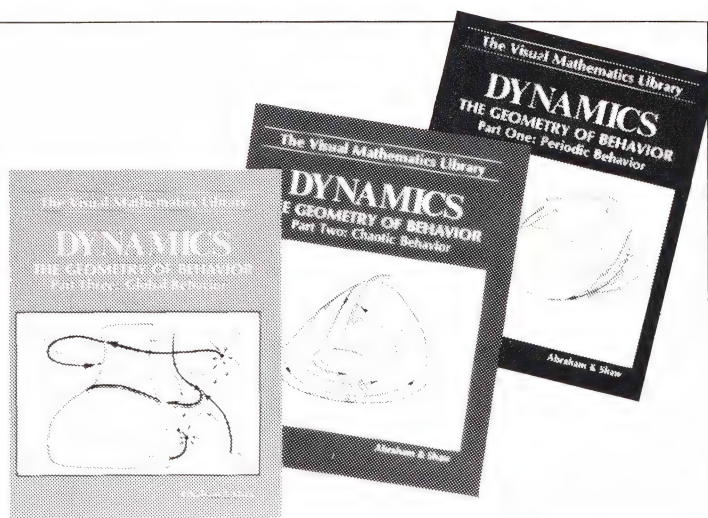
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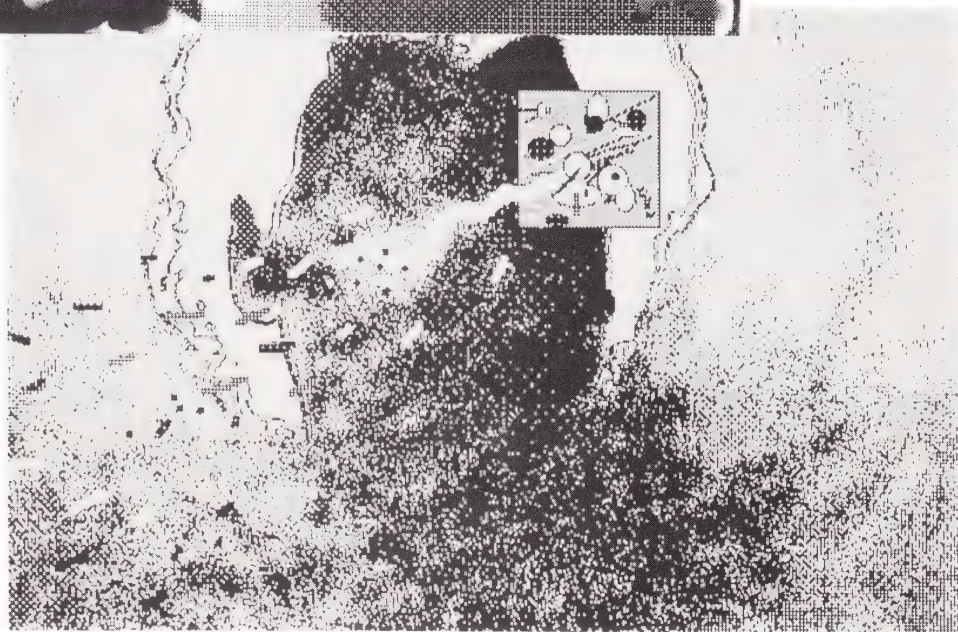
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Bet On It: Cyber Video Punk Performance

by Brooks Landon

Give me a Cray computer and someone who knows how to make fractal geometry work, and I'll show you why cyberpunk fiction — at least of the Neuromancer/Schismatrix molds — is over, give or take a few aftershocks. Give me a VCR, and I'll show you what I mean in just a few minutes, much less on fast-forward, on jet search — no time at all.

Even before it arrived, sparking and smoking like a cartoon anarchist's bowling ball bomb, cyberpunk fiction was headed somewhere else. Had to, and Sterling, Shiner, Rucker, Gibson, and Shirley all knew it; indeed, were too hip not to cheer the passing of their own parade. More important, they undercut expectations almost as quickly as we formed them, expanding the genre's limits rather than fortifying its center, defending form, resisting formula. For the real message of cyberpunk was *inevitability* — not what the future *might* hold, but the inevitable hold of the present over the future — what the future could not fail to be. What cyberpunk fiction offered — better make that “brandished” — was not speculation or extrapolation so much as simple, unhysterical, unsentimental understanding of the profound technological and epistemological implications of accomplished and near-accomplished cultural fact: what if they gave an apocalypse and nobody noticed?

Precisely because it took technology seriously, cyberpunk couldn't just create its distinctive semblance, then play out a string of antique narratives against a technosleaze backdrop. Its energy, its premium on information density, its unshadable determination to confront the new realities of postmodern culture, all meant that cyberpunk could never settle down in established comfort, over and over offering its readers exotic, but increasingly familiar territory, a comfy national park of the imagination where the neatly numbered conceptual hookups waited patiently for readers to park the campers of their minds. So, even before the summer of 1987, cyberpunk's major writers were all going in new directions, leaving its first star, William Gibson, to turn off the lights with *Mona Lisa Overdrive*.

But this party's far from over. As a descriptor of sensibility, an awareness, a killer rock in the rapids of

postmodernism, cyberpunk remains a significant term, a useful handle for creative and destructive acts across a range of media. It's just that as a term designating a kind of fiction, “cyberpunk” seems to me already a map without a territory, its current referents' works of fiction written almost exclusively by people other than cyberpunk's original creative cadre.

An offhand comment by Bruce Sterling brought all of this home for me. I was on the phone with him, asking questions for an article I was doing for *Cinefantastique*, and I was scribbling down names like crazy, some familiar, many I'd never heard of. Mark Pauline rang a bell, as did Rocky Morton and Annabel Jankel. Benoit Mandelbrot wasn't a problem; Stuart Arbright and William Barg were. What hit me was the fact that none of these people were writers, and Sterling nailed that thought down when he said: “Shoot, those guys are the real cyberpunks; we just write about it.”

... a punked-out John Wayne on a pogo stick, Harlan Ellison apologizing, or the Beaver in mirrorshades, Ward and June in drag.

Writing is the key here — not the process, but the medium, an ancient system for processing information, its two hi-tech moments, movable type and the steam press, having come respectively in the 15th and 19th centuries. In either of those centuries, Mark Pauline would have had to find some other way to blow up his hand, rocket fuel being a much more now kind of thing, as are Pauline's self-destructing robotic sculptures, and the Survival Research Lab videotapes of their profoundly science-fictional performances.

Mandelbrot's work with fractal geometry both represents and helps drive a new wave of computer imaging which allows the representation, generation, and manipulation of images, viewing perspectives, and degrees of realism never before possible. Jankel and Morton, probably best known for their computer-animated music videos for Elvis Costello's *Accidents Will Happen* and for Donald Fagen's *New Frontier*, detail this research in their

Our thanks to the Mississippi Review for permission to reprint this article from their cyberpunk issue 47/48, (University of Mississippi, Hattiesburg, 1988). Self Portrait Series Video/Computer Art by Joseph Bellacera with mixed media.

stunning book, *Creative Computer Graphics*, and put it to quintessential cyberpunk use when they dramatized some of its possibilities in the original British version of *Max Headroom*. However, it fell to Arbright and Barg to make in their eighteen-and-a-half minute cybervideo, *Hip Tech and High Lit*, the overt connection between cyberpunk fiction and the technology which more and more actualizes its basic assumption. More on that video in a moment, but first, the basic assumption.

In the December 1987 issue of *Cinefantastique*, I make the claim that the central assumption of cyberpunk may be "that life, like film, video, and computer data, can be edited as to become 'post-human,' radically reprogrammed through artificial evolution or redesigned by technology." Another way of explaining this is to say that the computer-generated special effects "magic" of recent SF film and the manic permutations and informational density of music videos such as Peter Gabriel's *Big Time*, Cutting Crew's *One for the Mocking Bird*, and Tom Petty's *Jamming Me*, become for the cyberpunk writers a key index to what everything will be like in the future — a time of designer drugs, designer genetics, designer surgery, designer prosthetics, even (courtesy of time travel) designer history. So strong is this notion of editing reality that John Shirley even used it to describe cyberpunk writing itself, as "more like a video process," and as "a mirror you can edit." Or, in Rudy Rucker's terms, "How fast are you? How dense?"

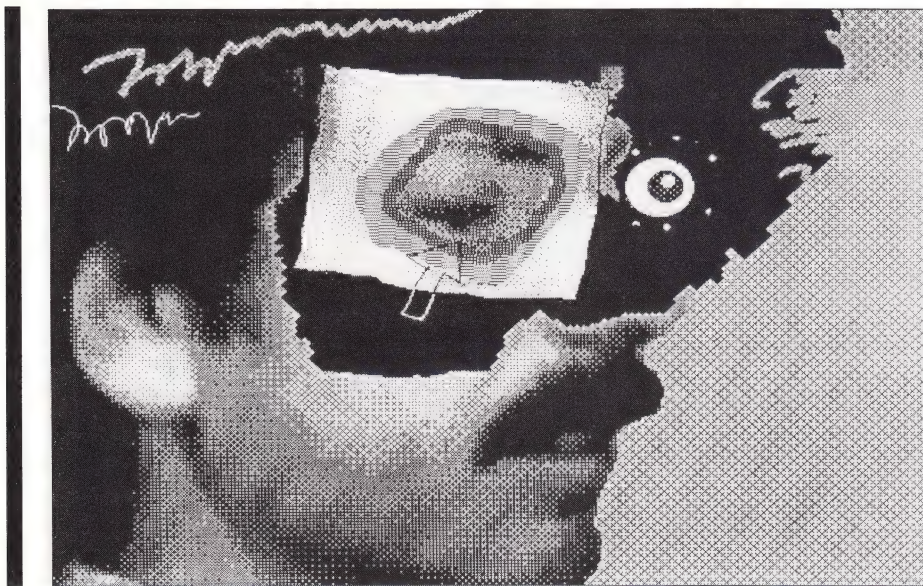
Which brings me back to video and computer technology. Measured in terms of other fiction, perhaps particularly other science fiction, the speed and density (informational complexity) of cyberpunk writing is stunning. But, measured against computer imaging and video technique, even dynamite prose reveals that it cannot compete in precisely these ways. Speed, density, and the process of editing assume dimensions in video and computer graphics that are simply beyond the reach of printed prose. Not a new ballpark, really, but a different

game entirely — comparing pixels with phonemes, were it not for the self-refractive, techno-intensive qualities of cyberpunk writing, the print-denying inevitability of its milieu. Captain James T. Kirk loses no credibility when he dons his granny glasses to read a novel in the umpteenth century, but try to viddy this: after a rough day in cyberspace, Computer Cowboy Case looks forward to nothing quite so much as settling down with a good book. Or put it this way: what integrity could cyberpunk fiction possibly have in a cyberpunk world? For that matter, how long can cyberpunk's profound lens of technological inevitability be turned on everything in our own culture but the game preserve of fixed text print?

My next point is that the power of cyberpunk writing, the new realism of postmodern culture, almost demands a reexamination of the status of writing in that culture. Insofar as cyberpunk writing directs our attention to MTV, *Max Headroom*, and computer-generated graphics which are rapidly becoming indistinguishable from "real" images of our referential world, it compels us to question the nature of representation in our world — and our traditional assumptions about the nature of fiction and narrative.

And those questions are being asked: whether or not we think much of the prospects for Timothy Leary's plans at Futique to develop an interactive computer game for *Neuromancer*, the scheduled panel on interactive fiction at the MLA Convention must tell us that the assumption of a fixed literary text is already under technological assault. The once radical-seeming cut-up production model of William Burroughs is tame stuff compared with a cut-up or multiple-branching model of reception of the text. Moreover, limiting computer technology to manipulating the ways in which words appear on the monitor is roughly analogous to purchasing a Ferrari one intends to drive only through school zones: if the cultural imperative places ever greater premiums on information density, language alone doesn't stand much chance in the conceptual marketplace. Images may not provide the pleasures and the challenges

of print, but there's no denying that electronic technology can do infinitely more with images and sounds than it can with printed words. In post-modern electronic culture, as in the Civil War, the prevailing attitude valorizes those artists who "get there fustest with the mostest," and it has fallen to some fifteen years of pioneering video art, and now to high-profile television — MTV and *Night Flight* and *Alive from Off Center* — to speed up our sense of narrative possibility, to remind us that video and computers don't just march to the beat of a different drummer than does fiction, but that they have inexorably juiced up that beat. This is precisely the message of cyberpunk, as it is of



most postmodern theory.

Most cyberpunk writing implies the conflation of time and deflation of space, terms suggested by Fredric Jameson in his seminal essay on postmodern culture and applied to visual media by Vivian Sobchack in *Screening Space*.

Enacting both phenomena is the Möbius-like relationship between cyberpunk writing's fascination with the themes and icons of electronic culture, at the same time as film, video, and TV are so obviously drawing from and/or paralleling the themes and icons of cyberpunk writing. *Max Headroom* provides the most obvious example of this interface, but it continues through *RoboCop*, Gibson's writing the script for *Aliens III*, Shirley's script for *Black Glass*, through a hefty percentage of music videos on commercial TV, and finally through experimental video, such as The Residents' *This is a Man's World* and *Earth vs. The Flying Saucers*.

A striking example of the technological displacement of narrative from print to electronic culture is the William Barg/Stuart Arbright video, *Hip Tech and High Lit*. Initially presented in June 1987 as part of a multi-media performance to an audience including both Sterling and Gibson, this impressive but by no means yet polished video represents an obvious transition from cyberpunk writing to the electronic modes of production I've been describing. Largely a found-footage collage of striking computer graphics, TV news footage, and original videotape, Barg's and Arbright's production establishes a compelling high-tech semblance, without positing any sustained narrative. The nonlinear progression of its beautiful and complicated images is further textured by an innovative soundtrack, a blend of voice-over readings (some by *Blade Runner*'s Sean Young) from Gibson's and Sterling's fiction with Arbright's electronic music. That music, much of it created by a Yamaha TX812Z FM tone generator and RX5 digital rhythm programmer, reminds us — as MTV does not — that technology has provided dramatic new ways in which sound, like images, can be generated and manipulated. What results from this combination is clearly *not* a dramatic adaptation of cyberpunk fiction, but an invocation of the technosphere so crucial to much of that writing.

Hip Tech and High Lit strongly suggests that computer animation and fractally generated graphics should be considered much more than merely the latest stage in the evolution of special effects associated with SF film. What this presentation does (as did *Max Headroom* and as, for much briefer duration, do many current music videos and the works of video artists) is to create a sensory environment as compelling and complicated as any conventional narrative which might be set within it. The clear evidence of this video and of a good part of my recent experience of electronic culture seems to me to be that the technology so effectively limned by cyberpunk fiction has the affective power to constitute a narrative line in its own right, an inherent narrative of technology, rather than the use of technology, to tell a conventional narrative in visual



media. In short, if there is something we can call cyber- or cyberpunk video, it is video that does or enacts the cyberpunk epistemology, rather than video used to dramatize stories by cyberpunk writers.

I'd like to suggest, then, that cyberpunk writing is at the heart of a new cultural and media convergence, bringing together writers, video artists, computer graphics experts, film and TV production, and performance art of the wildly different kinds represented by John Cage, Laurie Anderson, Kate Bush, Robert Longo, and Mark Pauline. This convergence seems likely to me to mark the end of cyberpunk's print stage, and to transfer its energy, innovation, and commitment to the global arena of electronic culture.

The first video played when MTV went on the air was *Video Killed the Radio Star* by the Buggles. That was no accident. I find myself wondering whether a similar technological imperialism might not eventually overshadow not only cyberpunk writing, but the literary genre of science fiction itself — not killing its central impulses, but editing them into new, more authoritative modes. Consider this: work now being done by mathematicians such as Michael F. Barnsley at Georgia Tech, seems to point inexorably toward the discovery of affine transformations (equations in fractal geometry) capable of generating virtually any target image. The implication of this research (see his new book *Fractals Everywhere*) is that "it may even be possible to convey a movie from one computer to another simply by sending a chain of formulas down a telephone line." Such a movie would be qualitatively more detailed than any possible cinematographic or video depiction of existing reality, as it would allow the viewer the unparalleled sense of flying into the picture, examining its component from every conceivable angle, even of predicting and exploring the information hidden beneath its surfaces. Such a film would be hyperreal, but could be made to do impossible things, like showing a punked-out John Wayne on a pogo stick, Harlan Ellison apologizing, or the Beaver in mirrorshades, Ward and June in drag. Would not such a representation be inherently science fictional, the essence of cyberpunk? And won't it be fun? ▲

BETTER BRAINS THROUGH ELECTRICITY

Ted Alsup
mind machine hacker
talks to R. U. Sirius

A blissed-out voice came over the line one night. It was Ted Alsup phoning from L.A. "I've got a device that'll open up your third eye like a master key opening a lock."

The lure was irresistible. "Is it portable?" Mu asked breathlessly.

Soon it was determined that Ted would bring it with him on his stopover en route to Maui. This machine, the God-Box, in prototype only, and the commercially available Endomax, were the objects of fevered expectation. A brain machine party was hastily thrown together with a score of eager experimenters in attendance, including representatives from The Universe of You, the Marin-based brain machine emporium, and New Realities magazine.

After wrestling with a recalcitrant laserwriter, I arrived late and in a foul mood. I strapped on the God-Box and within fifteen to twenty minutes, I was relaxed, lucid and high. The high was quite similar to a marijuana high without the paranoid edge or the stoniness. The party continued through the night and most of the people caught a buzz. Later, I tried the NeuroPep which, at the very least, is a fairly entertaining music-and-light show.

Ted Alsup specializes in knocking off overpriced brain devices and streamlining them down to the operative frequencies. His company "Mega Dynamics" can be reached at 866 Huntley Dr., Los Angeles, CA 90069, 213-854-5959.

—R.U. Sirius

MONDO 2000: Tell us a little bit about the origins of Mega Dynamics. How did you get into the brain machine field, and what was the first stuff you started working on?



TED ALSUP: Well, I had seen Meg Patterson's famous box (the one used to treat Keith Richards' heroin addiction) and thought, "Hey, this would be a great thing to be able to duplicate. I'll try to reproduce it." I looked at some photographs of her circuits and thought, "This is impossible. I'm not going to be able to do this." Then a friend of mine's boyfriend was on methadone maintenance and wanted to kick. So she said, "You *have* to make this machine for me." I researched it and found out it was not as difficult as I'd thought. I started reproducing the circuit. It was still very complicated and expensive. Then it dawned on me that we're really only using 8 frequencies out of all this potential. That's all that people had really found useful. So I figured out how to put those frequencies on tape, and I built a little adapter that runs off a Walkman. And that became the Endomax. The whole thing runs off a Walkman. It was an inexpensive way to do it. Keep the electronics in the lab. All you need is this little adapter, and voilà! People wanted it.

Ironically, the guy I made it for never used it. One day I had a manic-depressive over, and you know how manics are, they're always into everything. So he said, "What's this? Let me try it." I said, "Well, you can't. It's not something for you. It's for getting people off drugs." He said, "Heh! Let me use it." So he used it and two weeks later he came back and said, "I'm cured! I'm off my lithium." "Whoa! Wait a second! You can't do that! That's not for that!" And then two other manic-depressives did the same thing. I confirmed that they

were all homing in on the same two frequencies. Out of thousands of possible

frequencies, they were tuning in to the same two frequencies. One is an endorphin frequency — really lifts up the endorphin levels. These people had low endorphin levels which manifested as manic behavior. After a couple of days on the endorphin frequency, they would switch over to a mood elevating frequency that would give them more energy and vibrancy, and eliminate the depressive side of the cycle. By using those two frequencies, they pretty much eliminated their problem. Of the three of them, the two who I still have contact with are OK. From that point, I developed some variable machines . . .

M2: Now, describe what you mean by variable machines.

TA: Machines that you can vary the frequencies of. I had one of those “aha!” experiences where the little light bulb goes on. I thought, “Why not try employing the technique of hemisynching, which is used in soundwaves, to electrical waves.” For those unfamiliar, hemisynching is where you combine two frequencies that are beyond ones that the brain operates at. The brain, for some reason, operates at the difference between the two. That’s called the beat frequency.

So I put one frequency behind the right ear to the forehead and the other frequency behind the left ear to the forehead . . . and it worked. So I can intensify endorphin release by setting the differential at 6 to 8 cycles — which is in the theta range. Four cycles released the brain’s natural benzodiazopine. Stimulant frequencies are up in the high beta range. That’s a differential of about 15-20 cycles.

PACKAGING BRAIN STATES

TA: My NeuroPep was influenced by the Synchroenergizer. I started thinking about all of these sound and light devices and realized that the problem with these devices is that they require effort while using them. I mean, there you are relaxing. You’re going out there, somewhere between the theta and delta regions, and it’s otherworldly. Perhaps you’re even out of your body. Do you really want to have to reach over and adjust the dials? So I figured that I could tape record everything. I could take a four track cassette player and put pulses of light on two of the tracks and sound on the other two, so I have two tracks of sound and two tracks of light going in two different directions. I could optimally and completely reproduce one of these light and sound devices. In fact, I could do much better. Since this is not in real-time, I can do things that can’t be done by one man with two hands and an analog device. I could go into a studio and program the whole thing with computers.

M2: So you’re basically packaging brain states.

We’re packaging brain states. Yes. Exactly!

TA: We’re packaging brain states. Yes. Exactly! We can put people into any of a

number of brain states, get their brain operating more efficiently, get them into higher or lower states. We can put them on other worlds. We can create incredible visions, hypnogogic states. The effects are practically unlimited.

M2: What I really liked about the NeuroPep was that the tape wasn’t the typical sort of New Age music that usually accompanies these things. The sounds were novel and interesting.

TA: Yes. Some musicians are becoming very interested in this. We’re working on one tape that uses whale songs where we’re putting people into a primordial state. We also have an artist by the name of Michael Mantra who can create krias and kundalini rushes using gongs alone. What we do is correlate the frequency of light to the frequency of sound. By adding the light to the sound, we suspect we will be able to quadruple the effectiveness.

BLISSING OUT ON THE GOD-BOX

M2: Let’s talk about the God-Box. That was the best response I’ve ever gotten from a brain machine.

TA: This was an accidental discovery. I was working with multifrequency using the Ultron device. I was working with lower differentials — differences up to 30 cycles, the limit of the majority of the brainwave activity in man. I went above that to a differential of 300 cycles. We got to working up in the 1000 cycle range and I suddenly realized that I was getting incredible effects.

This is above the frequency that the brain will operate at. A differential of 30 cycles is the maximum. Suddenly we were getting results at 110, 140, 200 cycle differences. I was stumped. I couldn’t figure it out. My take on it is that we’ve all been working with notes and I’m the first person to create a chord, to pluck two notes at one time. Now, suddenly, the neuropeptides and the chemicals in the brain were receiving multiple notes and creating these chords that stimulate pituitary, pineal gland, and hypothalamic areas. We’re finding ourselves able to put a person into complete euphoria, bliss, contentedness.

M2: So how does the God-Box work and what is it like?

TA: Oh, it’s a very simple device. You put it on. You have a headband and two electrodes that are saturated with salt water that go behind the ears. You adjust the different frequencies and turn up the amplitude until you feel a tingling behind the ears and a pressure on the forehead. Then you can do whatever you want to; watch TV, count spots on the wall, or meditate. Meditating is probably the best, really, but the box is going to do it to you anyway. The device then stimulates certain areas in the brain, including the pineal. We recommend using it for no more than 30 minutes. Generally speaking,



MONDO 2000 will be covering the burgeoning field of mind machines, or altered states devices, in this regular feature. The next "Better Brains Through Electricity" will feature a dialogue between Dr. Denis Gorges and Dr. Ernest Friedman. The two have long been interested in Eastern meditative states and in computerized timing of brain functions. Dr. Denis Gorges is well known on the New Age scene as the developer of the SynchroENERGIZER. Dr. Friedman recently came to national attention with his work in the New England Journal of Medicine on Hitler's creeping Parkinsonism. He has long been known in medical circles for his innovative work in monitoring brain/mind functions, particularly the analysis of speech hesitation pauses.

Drs. Friedman and Gorges are working to develop diagnostic and intervention strategies, utilizing technologies such as the microprocessor, to optimize human performance and cognition and empathy. They want to use med tech to bring back those vanishing values: grace, style, humanism and dignity.

They will discuss recent findings in behavioral neurology, brain scanning, endocrinology, immunology, neurochemistry, neurophysiology, neurophilosophy and psycholinguistics. Comments from primary investigators in any of these fields are welcome.

people don't use it more than an hour every several months. The brain state causes real permanent changes.

M2: Interesting. Any other new ones?

TA: Let's see. We're working with a software engineer on developing a software/hardware package of an IBM compatible biofeedback brain monitoring system. We want to be able to hand the person the hard copy on their experience. You can get before and after printouts that will allow you to monitor your brain waves, to correlate brain wave manipulation with increases in short term memory, intelligence and, perhaps even creativity.

BRAIN MACHINES: NO JOKE

M2: Is there anything else you want to tell the MONDO 2000 reader?

TA: Watch out because people right now joke about brain machines. The reality is that they can do for your brain what the gymnasiums can do for your body. And we're starting to prove it! I'm ready to stand up and say, "Hold it, society. Wait a second. This stuff works and here's the proof!" People will be able to read their brain's activity at home. That's big news! ▲

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REVIEWS

RE/SEARCH

Reviewed by John Shirley

Re/Search #10: *Incredibly Strange Films* and Re/Search #11: *Pranks*, ed. by V. Vale and Andrea Juno

It's a big world. It's a swollen world. It's a tumescent world. It's an over-burdened, overflowing, data-loaded, high-content low-clarity world, soaked in media and opinion and idea and, above all, lies. What's important in all this input? Who decides? Which filters have you chosen? Have you mistaken the filters for the truth?

Re/Search — a publication which is sort of a perennial trade paperback — offers fresh filters and virgin frequencies. You can interpret *Re/Search* as the art underground's view of the underside of society, of art and literature and cultural doggerel: an artist's journalism. On the other hand, you can interpret *Re/Search* as simply a talented catalog of the unusual or an unusual exegesis of the usual (which sometimes includes the exquisitely banal). You can also simply say whatever it is, it's enormous fun.

Re/Search are the people who brought you the classic *INDUSTRIAL CULTURAL HANDBOOK*, "Essential library reference guide to the deviant performance artists and musicians of the Industrial Culture: Throbbing Gristle, Cabaret Voltaire, SPK, Non, Monte Cazazza, Johanna Went, Mark Pauline . . . new brain research, forbidden musical text and films, creative crime and interesting criminals, modern warfare and weaponry . . . psychotic lyrics . . . Over 120 photos . . ." This grotesque, deliciously decadent and essential handbook nearly defined underground art around the turn of the decade and into the 80's.

Re/Search also produced something the science fiction field should be ashamed of not having produced itself: a comprehensive work on J.G. Ballard, whom they aptly describe as "this supremely relevant science fiction writer." Ballard fans can order *Re/Search* #8 and #9: *THE J.G. BALLARD ISSUE*, directly from *Re/Search* Publications.

Most recently, *Re/Search* #10 and #11 offer up *INCREDIBLY STRANGE FILMS* and *PRANKS*. So, fanboy, you thing you know about sci-fi flicks? Hah! Not till you've got *INCREDIBLY STRANGE FILMS*.

IS FILMS quotes Picasso: "The chief enemy of creativity is 'good' taste." And goes on to relentlessly chronicle dozens of fringe films, "C" films, low-budget films, Drive-in films — it's a superior collation of what we in the Church of the SubGenius call "Bull Dada," stuff that's absurdly bad and yet somehow transcendent. Films like Herschell Gordon Lewis' *The Incredibly Strange Creatures who Stopped Living and Became Mixed-up Zombies* and Russ

Meyer's *Faster Pussycat, Kill! Kill!* and more artistically adult, subversive work from Larry Cohen — *It's Alive!*, *The Stuff*, *God Told Me To* — are entertainingly dissected via interviews with the filmmakers. The interviews are spiked with anecdotes and ribaldry and revelation, and broken up with vast numbers of wonderful, hilarious, even poignant stills from the films. Vale and A.J. cover Biker films, Juvenile Delinquent films, Beach Party films, LSD films, Women in Prison films (my favorite!), Mondo films, Santo, Ed Wood, Sexploitation films, Educational films (e.g. *Reefer Madness*), Industrial Jeopardy films. There are essays on horror filmmakers and every other demented sort. There's an A to Z directory of film personalities. And there are delightful and hysterical quotes from movie dialogue and narration.

You just aren't complete without this book. I'm telling you: it's hours, days, weeks, months and years of pleasure.

And it's a wellspring of unexpected truth. "The concept of 'good taste' is intricately woven into society's control process and class structure," the intro tells us. "Aesthetics



are not an objective body of laws suspended above us like Plato's Supreme Ideals. They are rooted in the fundamental mechanics of how to control the population and maintain the status quo."

To upset the status quo here comes *Re/Search's* latest, *PRANKS*, subtitled "Devious Deeds and Mischievous Mirth" from Timothy Leary, Paul Mavrides, Mark Pauline, Earth First!, Karen Finley, Abbie Hoffman — various politico-pranksters and performance artists. I'll let *Re/Search* speak for itself: "Pranks constitute an art form and genre in themselves . . . here (pranksters) challenge the sovereign authority of words, images and behavioral convention. Some tales are bizarre, as when Boyd Rice presented the First Lady with a skinned sheep's head on a platter."

To order the *INDUSTRIAL CULTURE HANDBOOK*, *JG BALLARD, INCREDIBLY STRANGE FILMS*, *PRANKS* and other *Re/Search* dark gems write for the catalog (SASE) from RE/SEARCH PUBLICATIONS, 20 Romolo St., Suite B, San Francisco, CA 94133, 415-362-1465 or ask your local bookseller to get the book from SubCo, P.O.Box 10233, Eugene OR 97440. (like, remember the article about Survival Research Labs in *SF Eye*? You can order superb, apocalyptic videos of SRL events direct from *Re/Search*). Don't miss this unique peep show: culture nude, culture in the raw. ▲

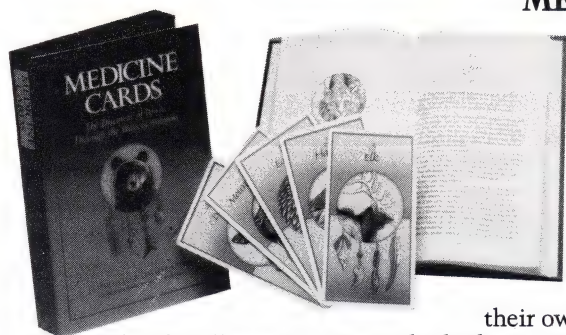
The latest issue of *Re/Search*, #12 on Modern Primitives, is just out and *Vale* reports that it's not for the queasy or faint-of-heart. It's subject, "tattooing, piercing,

scarification, and adornment," ranges from Mustafar to ancient Mayan body modification, and is richly embellished with graphics and photos. COCA (Center On Contemporary Art) in Seattle will be hosting a free art show on Modern Primitives all summer long.

Also out from *Re/Search* is a reprint of the 1899 classic by Octave Mirbeau, *The Torture Garden*. Decadent bureaucrat gets seduced by resolute Englishwoman and taken to an Oriental garden where torture is practised as a high art form. Splendid satire and indictment of colonialism and corrupt officialdom. Also in the works are reprints of two classics: J. G. Ballard's *The Atrocity Exhibition* and Daniel P. Mannix's *Freaks*: We who are not as Others.



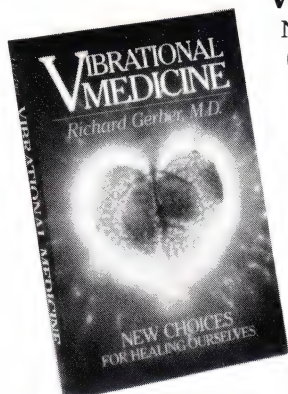
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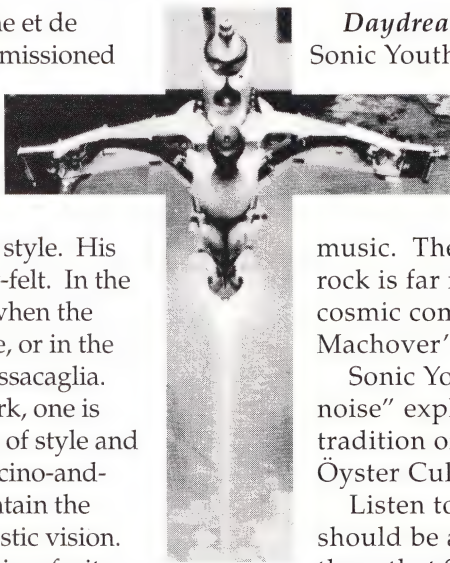
REVIEWS

VALIS by Tod Machover
DAYDREAM NATION by Sonic Youth
 Reviewed by Gracie & Zarkov

The power of Phillip K. Dick's creations comes from his direct experience of the psychedelic and gnostic. They continue to live as inspiration for other artists in various media. Two new albums in disparate avant-garde styles reflect P.K.D.'s influence.

In 1987, IRCAM (Institute de Recherche et de Coordination Acoustique/Musique) commissioned Tod Machover to create a multimedia musical work. He chose Phil Dick's most brilliant work, *VALIS*, as the basis for an electronic opera. Machover is an excellent composer of acoustic and computer music in the modern academic style. His response to the novel is obviously deeply-felt. In the opera, his music is sometimes lovely, as when the ghost of Xenakis hovers over the overture, or in the glassy electronic sonorities of the final Passacaglia.

However, for the remainder of the work, one is confronted with an embarrassing conflict of style and content. Simply put, the academic capuccino-and-croissant atmosphere cannot possibly contain the gut-wrenching weirdness of P.K.D.'s gnostic vision. Furthermore, rendering P.K.D.'s narrator in a fruity hoch-dramatisch style is a travesty. Setting the Hampton's "super hi-tech rock concert" in a style which ignores rock's own musical history and conventions is unforgivable. An interesting miss.



Daydream Nation is the latest album from Sonic Youth, whose entire oeuvre connects with Phillip K. Dick's "viral network of information."

Although not in Machover's league, SY are no strangers to electronic and electro-acoustic art music. Their raw psychedelic trash cyberpunk rock is far more resonant with the awe-full cosmic comedy pervading *VALIS* than Machover's sterile musings.

Sonic Youth's disquietingly cool "alchemy of noise" explores the territory of Art Punk in the tradition of the Velvet Underground and Blue Öyster Cult.

Listen to *Cross the Breeze* or *Eric's Trip*. It should be apparent to anyone who has been there that SY's music flows from direct (psychedelic) experience of the gnostic network's surreal synchronicities. It is difficult to believe the same of Machover's music despite his choice of subject. ▲

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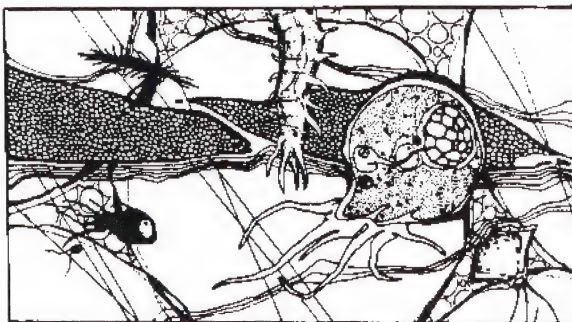
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PARTING SHOT: Have

Have we been liberated by personal computers? Not yet. Will we be liberated if we let things take their natural course and adopt a passive attitude? No way.

by Lee Felsenstein

I got into computers as social change tools when I realized that better ways of putting on shows were not going to get us functioning, sustainable communities. I walked away from the underground press, which was self-destructing about that time. I began to analyze various types of communication media for their information flow and I hit upon the use of computers. Not as a primary channel, but to supplement direct personal interaction by helping answer the questions of whom one should contact. Bulletin boards, directories, community memories were the thing. This in turn led to understanding the need for "convivial" forms of computer technology that people on the ground level could own, customize, and maintain.

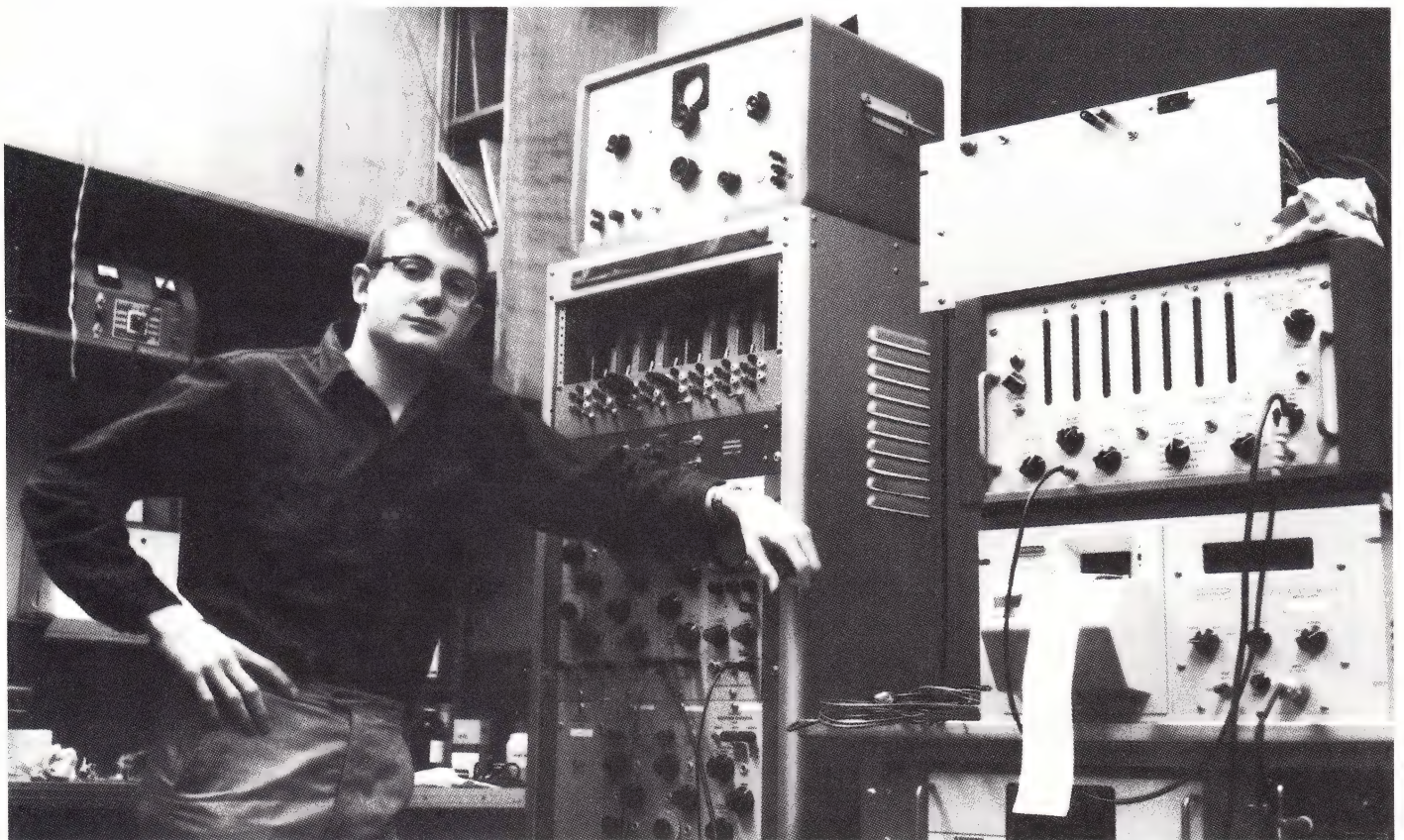
The personal computer was revolutionary in potential because it addressed the mechanisms of control that are

built into the technology. If people can gain control over their own channels, and have the technological means available to do that directly, then they can control their own communities.

"Can" doesn't equate to "will." We won the battle to develop a form and a culture that eliminated a lot of intermediaries — that's true. But the tendencies are still there, driven by lots of Big Money, to put everything back the way it was.

By that I don't mean vast plutocratic conspiracies to jail computer owners or whip up mob frenzies against computer infidels (many people I know would just *love* to be persecuted, but no one pays them any attention). Rather, what's been going on has been the ineluctable expression of the American Management Imperative best summed up as "find a space and fill it."

Ever wonder what happened to the guys in high school who would peek at everyone else's test papers, take an



I Missed The Revolution?

average, and put that down as their answer? You got it — they went into marketing and today control the product development process of the personal computer industry. Nothing will be done there if it hasn't already been done elsewhere. Maximum mass driven by minimum mentality.

That's how the revolution could be lost. Leave it to those beavers and personal computers would grow ever more complex, befuddling, impersonal. We'll be left with a class division of techno-peasants and techno-gentry, buttressed by the myth that long ago it was possible to have truly personal computers, but it's certainly not economical in this modern world.

In that outcome we would be free to piddle around in on-line data bases but we wouldn't have the ability to enter or change information. Software would get bigger and clunkier, requiring ever-higher levels of skill to install (try playing with *Windows*, if you want an example). All this would suit perfectly the centralized I'm-in-control-here sorts of mentalities that run business operations.

Somewhere way out on the fringes we PC freaks would be sitting around, a bunch of grumpy has-beens, drinking weak beer and talking about how things were in the Good Old Days when it really looked like anyone could do anything they wanted with our magical new machines.

Or: we can take some important advice from a bumpersticker: "Ignore Authority." Authority ignored us when we were developing the personal computer, and it suited us just fine. Here's a few more bits of sage advice: Follow your bliss. (Joseph Campbell) Do more with less. (Buckminster Fuller) Keep it simple, stupid! (engineering folk wisdom) Do what you're doing by doing what you're doing, not by doing something else. (obvious)

The most important aspect of the personal computer is its potential as a communication tool. Perhaps the most important outcome so far has been the proliferation of bulletin-board systems (BBSs). And the most revolutionary technological development in the last several years is packet radio, which offers the promise of long-distance communication efficiently with no privately owned medium.

These developments have been motivated by amateurs, with no significant external investment. In the case of packet radio, one of the most rigid government bureaucracies had to be fought in order to permit its legal development (more than I thought could be done.) And of course, once it's developed it still works whether it's legal or not. Good work, boys!

Western industrial society has no concept of reversing what it calls progress. If it's new, it counts as progress. I

can't quite see the forces of evil moving against this cultural imperative without taking on significant other sections of the culture. Of course, science fiction is replete with stories of what this might look like. Fortunately, SF is not accepted as mainstream literature, and these stories reflect more the thoughts of technical workers that "if society knew what was good for it it'd never let us get away with this," referring to the things that they are being paid to work on.

Have we been liberated by personal computers? Not yet. Will we be liberated if we let things take their natural course and adopt a passive attitude? No way. The system knows how to stabilize itself at a higher level of craziness when there's no concerted effort against it.

Will we be hunted down like rats on the tundra? First the power creeps would have to convince themselves that we're dangerous doing the kinds of things that make money for them. Then they'd have to open a Pandora's box which could and should result in *them* being hunted to extinction. They'd also have to convince themselves that we know more than they do, and arrogance is both a requirement for, and a disease of, power.

Are we stuck? Only if we let the power boys tell us what to do. The personal computer was developed with spare time, pocket money and a love for the experience of achievement. It was sport, not business.

The revolution isn't over. It's hardly begun. Now is the time to link up with the people we want to empower with the technology (probably spanning a wide range of politics) and work through phase two. The kids will be the ones to carry the process further — we need to provide something for their training and self-education.

The industrial system is built to produce large quantities of junk. Cast-off computers still work, or can be made to work, and you learn a hell of a lot by doing it. How about maintenance and upgrade clinics staffed by 11 to 17 year olds under the supervision of a few old grumps who remember the good old days? How about a Hacker's League based upon the example of the American Radio Relay League, which prevented ham radio from being stamped out when it became inconvenient for the power creeps? Why can't we have a few personal computer publications that have the feel of gun magazines — always with the knowing wink and the undertone of wait-till-they-see-what-happens.

Let's develop a little punk computing, folks! ▲

Lee Felsenstein is the designer of the first Osborne Computer, the founder of Community Memory and current President of Golemics Inc.

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(DTV Report, Marc Canter Interview continued from page 30)

FM: What's your goal with DTV?

MC: The holy grail of Desktop Video is being able to get good enough quality so that it does replace the broadcast quality boxes that cost millions of dollars now.

FM: Have you looked at these million dollar holy grail boxes?

MC: If you open up stuff like the Quantel Paint Box, all you'll find are three or four computer buses running at phenomenal rates, you'll notice custom chips and a lot of RAM. You'll also see a custom operating system, with a whole set of custom commands, and a very cludgy user interface.

From my perspective in the computer industry, for a small company to go off and design an operating system and a user interface for every product they have to invent is ridiculous. But this happens all the time in the video world!

FM: You mean there is little integration in video product design?

MC: That's right. In the video world, even products in the same product line have different user interfaces! They're all designed by different programmers and no one thinks to unify them. The things we now assume in the computer industry are not assumed in that world. I used to be a high end video editor and I know that world all too well.

FM: I guess that's why it pays so well to be a professional video editor.

MC: How many programs interfaces can you remember at the same time? With the IBM you can remember two, with the Mac you can remember seven. Well, in the high end video production world you *have* to remember fifteen or twenty! Each electronic box they use has its own user interface. And using high end boxes like the Quantel paint box is a real nightmare. That's why these video technicians get paid over \$200/hour.

My premise is that just like when people are talking about the workstation revolution and breaking through into the personal stations, and how that's going to help engineering, math, science and education, I think about how it is going to help video production.

So I'm saying, "Wouldn't it be nice to have a high end box work like MacPaint? Wouldn't it be nice if cell animation and 3-D animation were incredibly trivial to do?"

Then the creative types, the directors and producers, can do the special effects themselves. And this is starting to happen now. The new *Star Trek* movie uses the Mac II for scripting. It is not final level production, but it is used in animating the scripting process. And for the feature film industry, that's as useful as a spreadsheet, database, or word processor.

FM: So DTV is great for scriptwriters?

MC: Wouldn't it be nice to animate a scene before it was done, so you could see what it would look like? You can animate a pilot TV show with VideoWorks and then sell it to a network, just on that. It's already happened!

Using VideoWorks animation and simple video, rough cuts, like an animatic or something, a creative writer can put together something that really communicated what the story is about, rather than just words on a page.

That's why the user interface is really key in all of this. Because creative people are using this stuff! So then, to bring it back to the issue of what's in these high-end boxes, go look at the LoveCo Transputer card, or the MAC DSP, or the TI card, or the Tektronix card with the Motorola 88000 RISC chip on it.

That stuff provides the same computer power for the Mac II that is in these high-end broadcast quality boxes! Then all we need is that hyperfunctionality in the computer bus. There is a company called Digital FX. They are funded by Kleiner/Perkins and Mitch Kapor. Apple just invested in them. They just put out their first product and they are already valued at \$35 million. Their \$100,000 workstation does the equivalent of an entire multi-million dollar video studio's collection of boxes.

Now, can you imagine these new high performance cards running underneath my software? That's the DTV of the future. Everything available now is a toy, a joke, compared to what's coming. It's still the 80's.

FM: What do you think of videodisk technology?

MC: They can be used not just to look at graphics, and not just to put graphics on videotape, but to take a tape or a live camera and take graphics from the videodisk and insert them on top of the image. That action performs the traditional video studio functions of titling, superimposing, et cetera.

Videodisks are big business. Did you know that the U.S. Government is going to spend two billion dollars next year on videodisks?

With business you've got to look at the LCD, the Lowest Common Denominator. There are omniplayers now that can play videodisks and CD's. So as more films are transferred to video disk, a critical mass will be reached. More and more people will buy these omniplayers, which brings down the price, which in theory will lead to a computer that will have these disk players built into them.

Sony actually put out a machine like that three years ago called SMC-70. People in the video business saw it. But they, as a group, don't even realize what good software means. And people in the software business are crippled, especially in the PC market, with the graphics that they have. The Mac is great, but only recently has transfer of color graphics to video tape been possible.

FM: So what's the bottom line here?

MC: Even though we're making great advances in computer graphics, until your computer can just plug into your VCR, it's a total joke. You've got to have high quality graphics, you've got to have good sound and that means a decent VCR and stereo speakers. And a really long wire to connect with your stereo, because the odds are that your stereo system is not located near your computer. This is the stuff that sells products.

(continued)

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FM: What about more subtle uses of computer graphics?

MC: They're used as subliminals. Take a look at how ABC's logo looks on Monday Night Football. Look at the dropshadows, the way they evolved their look. A much more modern look than the old ABC. And it is all implied in the graphics. The psychology of the entertainment industry is in these logos.

LATEST IN MAC II VIDEO CARDS — COLORSPACE FX

The Colorspace FX by Mass Micro Systems offers many features not yet found on other video boards. FX captures live video images at a rate of 30 frames per second (real-time) in full color. It permits easy sharpening and blurring of the video image, and its video special effects include mirroring, kaleidoscope, horizontal and vertical flips, zoom in and out, picture squeeze, shrink, and anamorphic distortion.

The "shrink" feature allows a flicker-free video image to be contained within a hypercard window on the computer screen. Because the video signal is left in analog, it can be run simultaneously with other computer programs.

"This means that you can watch *Star Trek* in one window while working in *FullWrite* in another window with no system speed degradation at all," says Bill May, FX software engineer. "There is no system overhead to watch real-time video. As far as I know, this feature is unique to FX."

FX also allows end-users to write their own Hypercard scripts for user-designed applications and special effects. The FX is also capable of displaying images at 60 frames/second on non-interlaced multi-sync monitors or at 67 frames/second on an Apple monitor.

Another unique feature of the board is its multi-standard video capability. FX will allow users to output Mac II-generated images to any NTSC, PAL or SECAM standard video device.

"You could have a PAL laser disk, an NTSC camera and a SECAM broadcast signal, switch between them and not even know that you are working with different standards," claims Larry Samuels, Mass Micro V.P. "The BBC is looking at using FX for broadcasting NTSC-based laserdisk images onto the British PAL standard TV system."

The Colorspace FX is considered a video pre-processor for Mass Micro's Colorspace II, a frame buffer and video overlay board. Colorspace II can digitize FX video images for manipulation within paint programs. By itself, Colorspace II comes with genlock and Chromokey, and will grab still images in a digital buffer, color in a second, monochrome in 3/10th of a second. Available by this summer, Colorspace FX will sell for \$2995. Available now, Colorspace II is \$1995.

Mass Micro Systems, 550 Del Rey Av., Sunnyvale, CA 94086, 408-522-1200 or 800-522-7979.

JULIAN SYSTEMS — THE WORX

Julian Systems presented The Worx, their Mac II-based integrated video production system, at MacWorld this year.

The Worx incorporates video editing, digital audio, computer graphics, animation, painting, titling, and video cataloguing into a single workstation.

In The Worx, sound is digitally recorded in real-time onto a Macintosh hard disk in CD quality (16 bit, stereo between 44.1 and 156 KHz sample rates). Once in the system, segments of sound are named and timed with visual images.

The genlock and overlay display cards of The Worx allow the use of any Macintosh paint or desktop publishing program for painting and titling purposes. A real-time frame grabber captures still-frames from a video source for paint program manipulation. Macintosh animation programs like Videoworks II or Hyperanimator can provide both canned and custom animation sequences to video productions. A Hypercard interface is used to control the NTSC converter and genlock functions.

The video editing process within The Worx uses a dedicated database program for tracking script, SMPTE time code calculations, edit lists, list cleaning, ripple calculations, budgeting, and frame accurate editing.

The Worx also includes a professional JVC S-VHS editing deck and field camera. Future plans call for the use of the new JVC M-2 digital metal videotape format, which shows no degradation of the video signal quality for 17 generations of tape.

The entire system sells for around \$60,000 with each installation tailored to the needs of the individual buyer by Julian Systems. Monthly leasing of The Worx is also available.

Their new Mac/Video products include their RGB decoder, which converts a standard NTSC composite video signal (from a camcorder or VCR) to the higher quality RGB video signal. This allows you to create 24-bit high quality images on the Mac II from video sources, using standard 8-bit technology.

Julian Systems, 2280 Bates Av. Suite J, Concord CA 94520, 415-686-4400 or Fax: 415-686-4244.

FUTURE THOUGHTS

Back in 1984, Apple ran an extraordinary advertisement directed by Ridley Scott of *Blade Runner* and *Alien* fame. Heralding the arrival of the Macintosh, it proclaimed "... 1984 won't be like 1984."

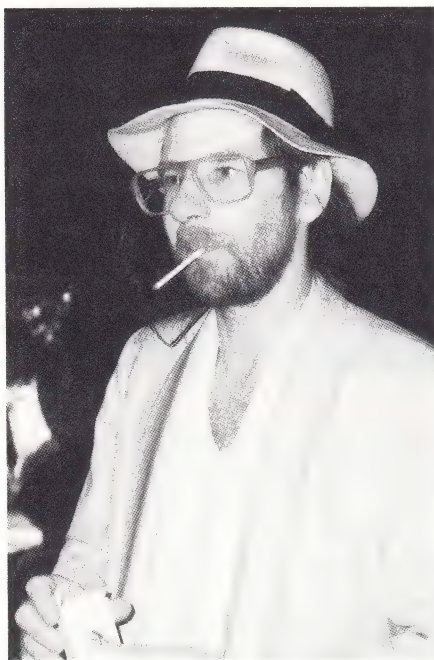
Well ... maybe. Certainly the dissemination of millions of PC's has evened the score somewhat in this information age. But the fact remains that the average American spends 7 hours a day being spoon fed video pabulum by enormous multi-million dollar conglomerates.

Desktop video ought to put an end to that. By having hands-on editing experience, millions of Americans will see how easy it is to manipulate the images that infect us. Imagine being able to intercut scenes from *Rambo* with scenes from *Mr. Rogers' Neighborhood*, fast and easy, in the comfort of your home. What fun! What power! It's time to commandeer the screens!

Contributors

TAYLOR BARCROFT Since 1977 Taylor has tracked new media and was the developer of a cable TV satellite program service. From '84 to '87 he covered the whole spectrum of literature on the Mac with a quarterly of abstracts called *MacBriefs*. He's our in-house tech wiz and is currently spearheading the development of our *VidScan*™ edition. *AppleLink*: D3574

FAUSTIN BRAY and **BRIAN WALLACE** Faustin and Brian are pure signal transmissions. Their company, Sound Photosynthesis, is one of the great cultural resources of the New Age community. Their tag-team photoelectricity generates a vast array of "New Ideas" audio/video tapes and CDs. Students of Ali Akbar Khan, they apply their composing and performance skills to their band *Intuit!* They can be reached at PO Box 2111, Mill Valley, CA 94942.



BRUMBÄR Lifetime student of the nervous system and visual cortex, his artistic output runs the gamut from lightshows, happenings, movies, TV, radio plays, comix and illustrations. Formerly publisher of Germany's premier underground magazine, he has recently caught the shuttle to cyberspace. Currently playing with low-budget guerilla-type computers (the Mac, Amiga, and Fairlight/CVI), he is working closely with Timothy Leary and William Gibson on several projects.

DAVID BUNNELL David founded five of the most popular personal computer magazines including *PC Magazine*, *Personal Computing*, *PC World*, *Macworld*, and *Publish!* A visionary entrepreneur, he is also known for his concerns about the quality of life in our society. He recently started a computer learning center — Computers for You — in the heart of one of San Francisco's most depressed neighborhoods. Currently he is president of Io Publishing, a new company dedicated to the exploration of business opportunities in electronic and mixed media publishing. Io Publishing is at 217 S. B St., San Mateo CA 94401, 415-340-9011.

GEORGANNE DEEN Someone described her work as "Georg Grosz meets Lynda Barry." The combination of vitriol and whimsy nearly — but not quite — sums up her graphic genius. Transplanted from New York to Los Angeles, Kitsch inspires her. Also: Greed, Lust, Jealousy, Power, and Control. She hangs out with Brumbär and Timothy Leary.

LEE FELSENSTEIN Lee was one of the star designers at the late Osborne Co. and co-founder of the Community Memory Project. In the wild and woolly early 70's, he was military editor of the *Berkeley Barb*. The subject of much press attention including "Lee Felsenstein Helps Japan Battle IBM," he is now working on the utilization and exportation of 70's technologies to realize the U.S.S.R. computer hacker's revolution.

CAROLYN FOK Carolyn is an editorial illustrator and an artist formulating her own tradition. She is also a performance artist in the industrial underground where she is known as techno-tribal rhythm composer Cynai. Her work has been described as "exotic, something to be experienced."

WOLFGANG GERSCH Wolfgang melds art, cosmology, and projective geometry in his breathtaking murals for Silicon Valley companies. A visionary surrealist, he has been described as "an airbrush Michelangelo." His Pristine Chapel is the clean room at the new Intel Research Center in Santa Clara.

NICK HERBERT One of the original "Dancing Wu Li Masters," and long time student of the Quantum Mechanics of Everyday Life, Nick's writing has spanned the whole of Fringe Science from Nikola Tesla, Bell's Theorem, and the physics of Psi Phenomena, to Houdini, the Metaphase Typewriter, and the Sexing of Quartz Crystals. His book *Quantum Reality: Beyond the New Physics* (Doubleday, 1985) has been translated into six languages. His latest book, on time travel, is *Faster Than Light: Superluminal Loopholes in Physics*.

SCOTT KIM Palo Alto calligraphic genius and author of the extraordinary book *Inversions* (BYTE Books, 1981; new edition W. H. Freeman, 1989). His antic way with geometrical symmetry and graphic palindromes leaves one gasping. *Letterforms and Illusion*, typographic puzzles software for the Mac, will be released by W. H. Freeman in August. Now designing a completely visual mathematics curriculum.

ZENA KRUZICK Freelance photographer, swimwear designer, and art show curator, Zena has a particular fondness for bizarrerie and grotesquerie. A former graveyard manager, she is working on a photoessay book on death in various cultures. Wine snob and collector of skulls, orchids, and masks, her license plate reads ZENOIDZ.

TIMOTHY LEARY As Cyberdelic Guru of the 80's, he is now utilizing computers and software to effect brain change. His *Future History Series* is enjoying a renaissance through a new release by Falcon Press. Tim's software company, Futique Inc., has just released *Interscreen*, a computer *HeadWare* program for processing and performing books and communicating thoughts. Write: Futique Inc., PO Box 69886, Los Angeles, CA 90069.



ALLAN LUNDELL Portrayed in *Vanity Fair* as the new age high tech guru of Santa Cruz, Allan is a one-man clearing house of information on future media. His new book on computer viruses, *Virus! Invaders that Breed and Destroy*, is one of the first looks at what makes computer virus creators and exterminators tick. A real insiders' book. At \$10, it can be ordered from Contemporary Books, 180 N. Michigan Av., Chicago IL 60601, 312-782-9181.

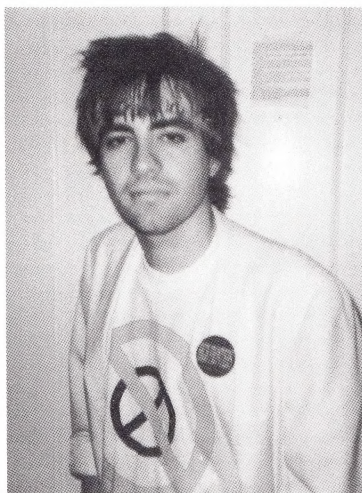
GREGORY MACNICOL A physics dropout, Tesla coil fanatic, and ex-MIT rabble rouser, Gregory is Santa Cruz's mad scientist gone graphic. His present specialty is chunking out high-res, mondo-chic, low-cost, action-packed, computer generated animation from his Santa Cruz laboratory. Gregory can be reached at 222 So. Branciforte, Santa Cruz, CA 95062, 408-426-0403.

TERENCE MCKENNA Logomagician and philosopher, is author, with his brother Dennis, of *The Invisible Landscape*. In California he is currently writing, lecturing, and managing Lux Natura, which distributes his *Timewave* computer software, books, and numerous audio tapes including a talking book, *True Hallucinations*. In Hawaii he is secretary-treasurer of Botanical Dimensions, a non-profit research facility which cultivates and preserves plants of ethnopharmacological value.

JUDE MILHON A 21st Century bluestocking and universal Anima, Jude has been the muse and inspiration to the hacker underground since the early 70's. Her racy tale is chronicled in the book *Hackers* but she prefers to maintain a mysteriously low profile. A Stanford P. A. (physician's assistant), her sole regret is that she can't prescribe.

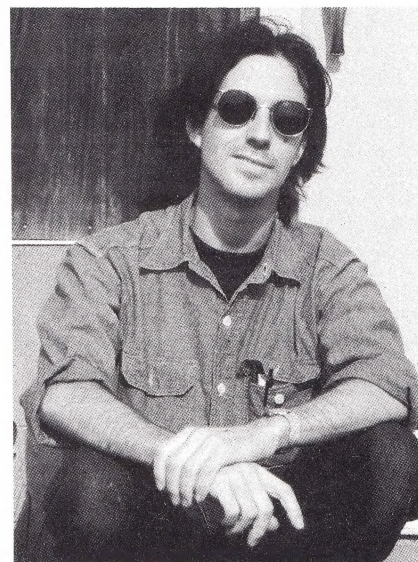
JEFFREY MISHLOVE The genial host of *Thinking Allowed*, Jeffrey is the author of *The Roots of Consciousness* and *Psi Development Systems*. Former president of the California Society for Psychical Study, Jeffrey holds the only Ph. D. in Parapsychology ever awarded by an accredited American university (UC Berkeley).

JAS. MORGAN and CATHY MOE MURPHY The happening dyad, Jas. & Cathy run a music/graphics design/publicity outfit called "Space Vegans!" Jas covers the Cyberpop beat and, as "Eight Circuit Eddie," the burgeoning field of mind machines. Cathy is an astrologer, channeller, and graphics specialist. Space Vegans! can be reached at PO Box 9637, Berkeley CA 94709.



CHARLIE POWELL Charlie's art is a fixture in the Bay Area alternative press and frequently adorns the cover stories of the *East Bay Express*. Currently playing Ralph Steadman to Morgan Russell's Hunter Thompson, he is doing the illustrations for *Hackers*, *Crackers*, *Tweekers*, *Phreakers*.

MORGAN RUSSELL Morgan has been the subject of bemused speculation ever since his work hit the pages of *High Frontiers* #4. Pundits pronounced him "the next Hunter Thompson" and, though he wields a sharp stiletto for a pen, his true love is photography. He favors the Leica rangefinder for its ability to silently skewer his subjects. His subjects currently consist of the high-tech demimonde of the Bay Area — computer outlaws and rogue scientists. He is finishing a book called *Hackers*, *Crackers*, *Tweekers*, *Phreakers* which should be out next Spring. He is related only spiritually to Morgan Russell, the Orphic Cubist.



MICHAEL SYNERGY Synergy is a rising star in the cyberpunk firmament. While Robert Anton Wilson has been called a guerilla ontologist, Synergy might be dubbed an ontological terrorist. The subject of a report in London's *20/20*, "Terminal Madness," he's the man to interview on the hacker underground. Currently he is working on an autobiography *Cyberpunk: High Tech Lowlife* and acts as a consultant in the Bay Area.

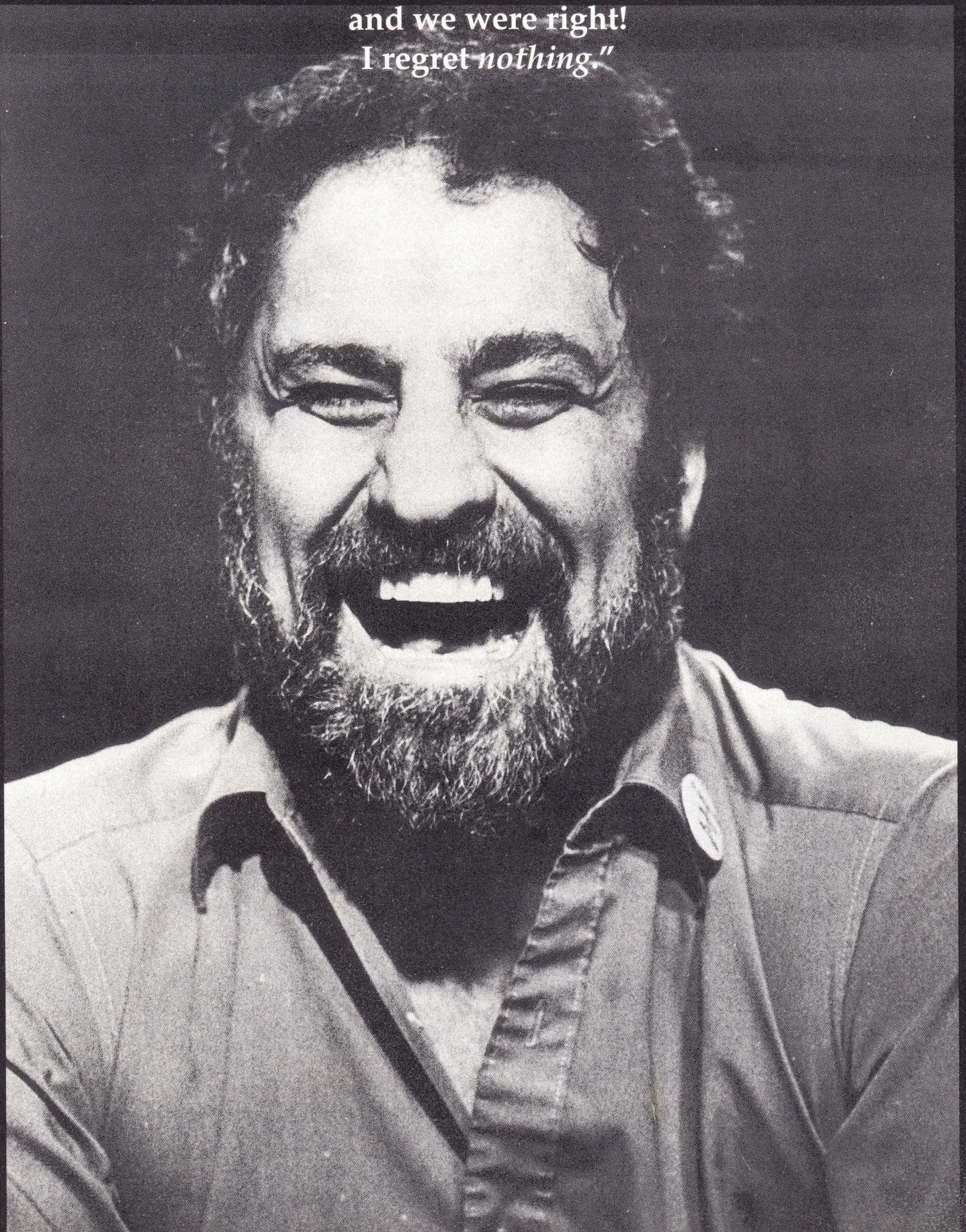
WES THOMAS Soaring above Flatland and snailmail, Wes moves between extraspatial dimensions at hyperspeed. Remember the comet Kohoutek? That was trickster/publicist Wes' brainchild. He has moved on to new cyber-arenas for his boffo genius. Next? HyperCon — a virtual conference in hyperspace. Co-author of *The Art of Desktop Publishing* (Bantam) and publicist extraordinaire. MCI Mail: WES THOMAS; CompuServe: 72737,1245; BIX: WESTHOMAS; The Well: WES; fax: 516-266-1132.

LARRY WELZ You know, Cherry Poptart's dad. While Larry's original vision for the *Cherry* series was "like Archie comics, only where Betty and Veronica *panned out*," recent issues have explored multi-media and sci-fi themes. Look for the forthcoming spin-off comix, *Ellie Dee*, featuring Cherry's svelte, computer hacking companion. Larry's work is available from Last Gasp in San Francisco and in better comix shops.

ROBERT ANTON WILSON "Mr. 23" himself, is a novelist, poet, lecturer, stand-up comic, futurist, and guerilla ontologist. Our new political columnist, Bob currently resides in L.A. with his spacemate, Arlen, where he is working on screenplays and publishing his quarterly newsletter, *Trajectories*.

ROGER WILSON Roger created our masthead surrealistic landscape "Metro Gnomes," a still frame from the film *Mental Images* (Berlin, 1987). Worked on German magazine *VideoAktiv* and did the computer graphics for Universal's *Night Rider* and *Airwolf*. Now teaches others to do marvelous things with their platforms. Freelance technical director. Roger Wilson & Associates, 914 Arizona Av., Santa Monica CA 90401, 213-394-2660

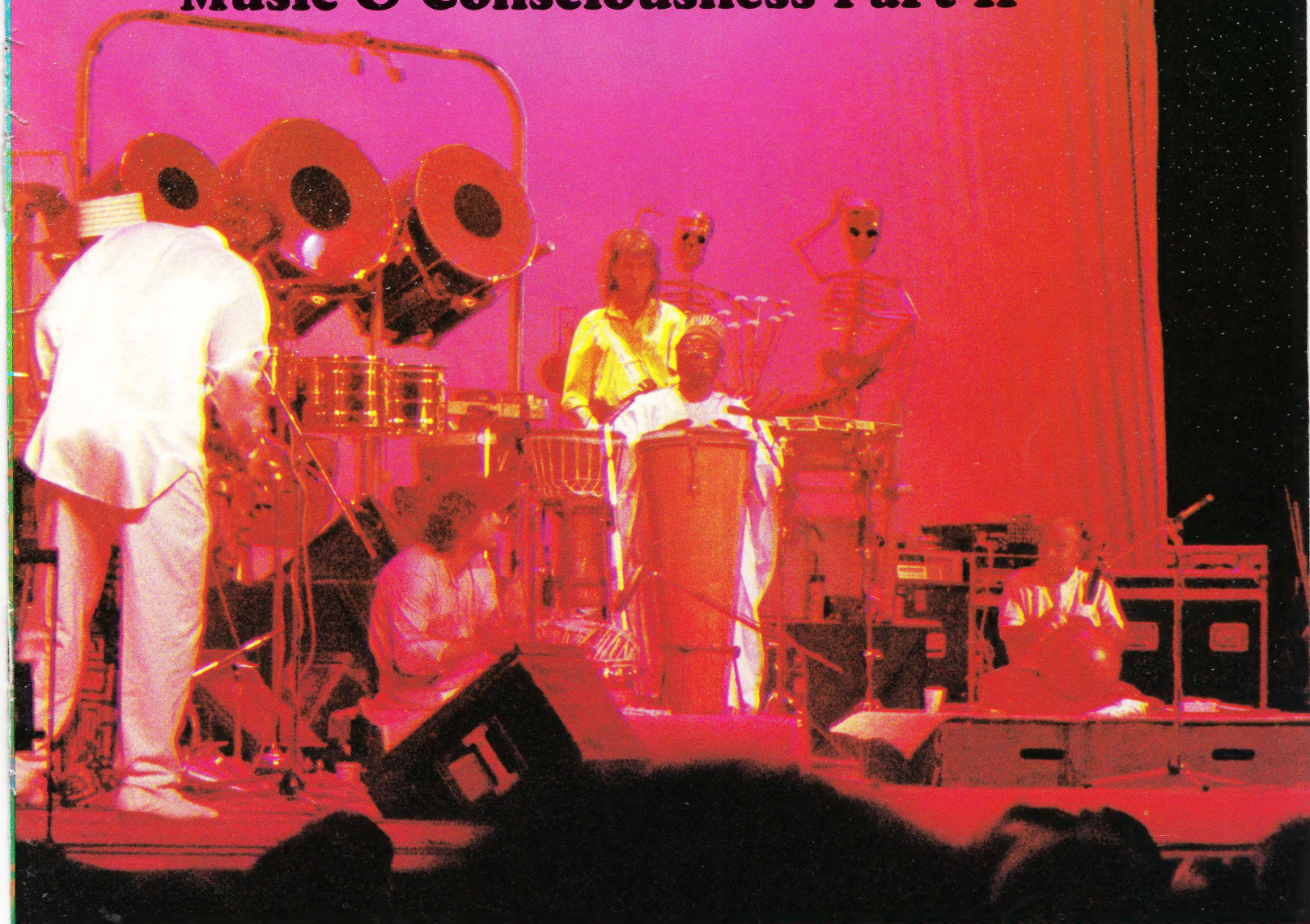
"We were young, we were reckless,
arrogant, silly, headstrong . . .
and we were right!
I regret *nothing*."



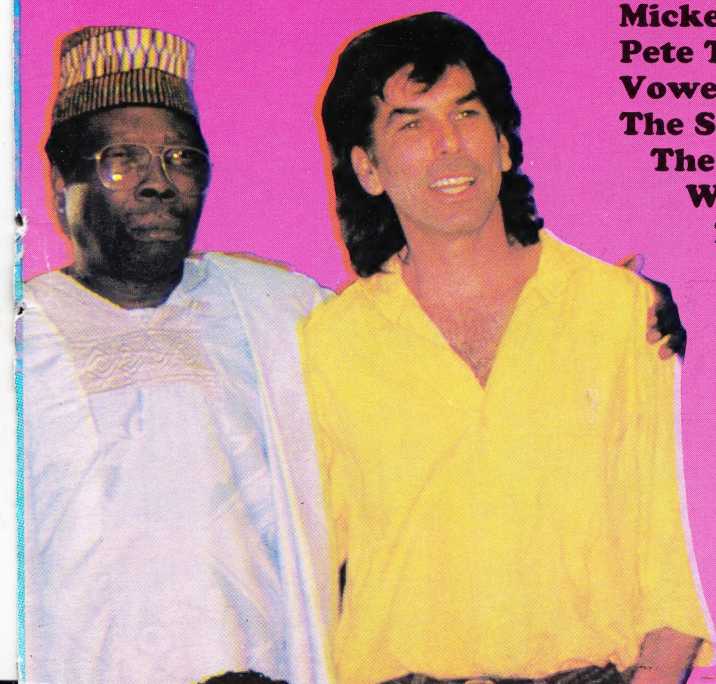
Abbie Hoffman's Last Public Words, Vanderbilt University, April 4, 1989

Coming Soon:

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FAUSTIN BRAY

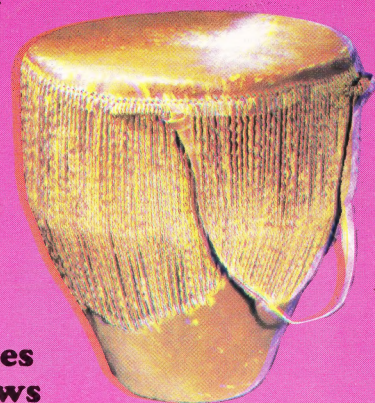


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